RAILROAD GAZETTE

FRIDAY, JUNE 16, 1893.

CONTENTS.

Contributions.

Accident Record-Correction.

Baltimore & Ohio Railroad Company,
BALTIMORE, June 10, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I note in your issue of June 2 [page 410] that you have credited us with a boiler explosion near Connellsville, Pa. Will you kindly correct this item, as such was not the case. On April 5 engine 305 broke an eccentric rod and strap and a hole was made in the fire-box, which was all that occurred. There was no explosion in any sense of the word.

G. B. HAZLEHURST,
General Sup't Motive Power.

The Hinson Coupler at the Western Club Tests.

CHICAGO, June 12, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to the coupler test of the Western Railway Club published in your issue of June 9, we desire to call your attention to the coupler called "Hinson Perfected," or, as shown in cut, "Hinson Pfb." There is no Hinson Perfected Coupler; that coupler is known now as the "National," and the word "Hinson" should not have been used, as it is misleading. In looking over the different cuts, a person not familiar with this coupler would naturally suppose that it was the Hinson. HINSON CAR COUPLER CO.

J. E. FORSYTH.

What Is a Good Rail?

NEWBORN, Ga., June 10, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Do you publish any standard specifications for steel rails? If so please send me a copy. If you have none for sale, can you not give, through the next issue of the *Gazette*, the most important points in the usual specifications for steel rails?

Can a rail from whose base a piece 1¼ × 2 in. is broken by a spike accidentally striking it be considered of first quality under any "usual specifications"? Of course I have my own opinion, but would like something standard. * * *

[For specifications write to R. W. Hunt & Co., the Rookery, Chicago, or Hunt & Clapp, 116 Water street, Pittsburgh, or P. H. Dudley, 54 Pine street, New York, or any one of a dozen large railroad companies. There are no specifications that are accepted as standard. We never heard of a rail being broken by such a cruel and excessive test as dropping a spike on it and should not like to commit ourselves as to the quality of that rail without time to think and ask the doctors. A few first principles of specifications will be found on the editorial page.—EDITOR RAILROAD GAZETTE.]

Laying Out Freight Yards.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I am glad to read the letter of "Civil Engineer," in the *Railroad Gazette* of June 2, on laying out freight yards. I hope there is no sneer hidden in his suggestion that there be "a sort of roving commission appointed, composed of brakemen, conductors, yardmasters and such like . . . to act in consultation with the chief engineer in laying out prospective yards." If there is a sneer in this sentence it is, like enough, one result of similar sneers that Mr. Morrison has concluded that "it is impossible for any civil engineer to have practical knowledge of all branches of railroading."

In yard designing most of us would bar the brakeman and conductor, though humble people like myself have learned a thing or two from brakemen and conductors; but I can hardly think that "Civil Engineer" would not be glad to have the opinion of a good yardmaster on a yard design. I doubt if Mr. Morrison would choose a yardmaster absolutely to *design* a yard—it is not a yardmaster's trade—but I have no doubt he would see that some one with a practical knowledge of yard work had a voice in it. Of course, yardmasters may easily be wrong in their ideas, and may oftener have difficulty in expressing them. If they have always been struggling to get work done in ill-designed yards they may find it hard to conceive of a really good one, but I have known few yardmasters who, if they had been given a free hand, could not have improved the design at least of their own yards.

"Civil Engineer" lays down as a basis for argument the proposition that "there certainly must be only one best way" of arranging the tracks in yards, granting that "each may possess an individuality of its own." Most of us will be glad to accept this as an axiom, if we may lay stress upon the individuality necessary in each yard. Some yards are used only to change engines and cabooses on solid trains. Some must provide for changing the train length as well. Some yards must provide for a large local business inbound or outbound, or both, and at others many of the trains must be shifted so that the cars for each destination stand together and, perhaps, in a certain order; and there are other sorts of yards besides. Each of these should have a distinct individuality.

Again, the methods of doing the yard work must be considered. If the cars are to be shifted back and forth you need one kind of yard. If they are to be moved by gravity, as at the Edgehill yard of the London & Northwestern, you need another. If they are to be "poled," as at the Hawthorn yard of the Chicago, Burlington & Quincy, and at various places on the Pennsylvania, you need another. Here is another sort of individuality, and, as these conditions vary, the design of the yard should vary. If it does not conform to the conditions you have a bad yard.

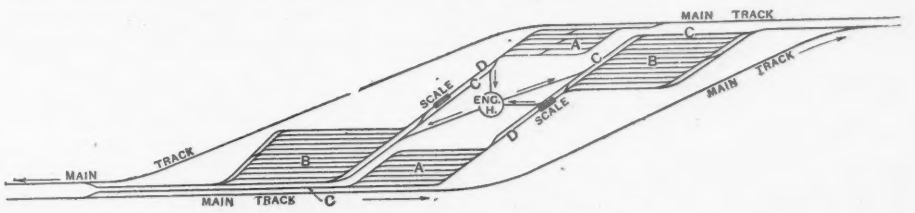
"Civil Engineer" asks what is the governing fault of freight yards. The reply is: "The individuality of most yards does not at all conform to the individuality of the work they have to do. In this lies the fault."

It is not enough to give the number of cars to be handled daily; the number of cars per train is important, but both these items are not enough, and for this reason it is very hard to criticise "Civil Engineer's" yard plan printed with his letter. Ought he not to tell us how many cars each of his tracks will hold and what the grade is, and then give us some idea of the work to be done? H. D. W.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Following up a suggestion made by "Civil Engineer" in your issue of June 2 I submit the accompanying as a standard plan for a freight yard. In this *A* is the receiving yard, the capacity varying according to business, say 500 cars a day; the train being made up of 20 loaded cars, four tracks of 50 car lengths, with crossovers, would be sufficient. *B* is the classification yard with straight tracks and a maximum descending grade of 0.3 per cent. and parallel ladders. For a capacity of 500 cars a day the tracks should have a length of 60 cars, the number to be governed by the number of classifications which you desire to make.

At the end of yard *B* there should be a track *C* which is a continuation of the poling track, with a crossover at some suitable point to allow two road crews to work at the same time without interfering.



Yard Arrangement—Proposed by "W. S. S."

A yard of this description with a crew of one engineer, conductor, and three brakemen in yard *A* to place trains on the polling track *D*, and an engineer, conductor, and nine brakemen, three of them switch tenders, one poler, one cutter and four droppers classifying trains should handle at least 525 cars, working 10 hours, cutting at the rate of two cars to the cut.

In this arrangement the passenger tracks are outside of the yard. It is the modern practice in shifting trains to pole them, as it is easier on the cars, to say nothing of being the quickest way. W. S. S.

Division of Traffic and Maintenance of Rates.

BY S. Y. M'NAIR.

Notwithstanding that new methods have been formulated and put in practice in almost every branch of business of any magnitude, in accordance with the development of the country, increase in population and the progress of the age, yet in the traffic departments of railroads but few improvements have been made either in the methods of obtaining traffic or in the maintenance of remunerative rates. When the Interstate Commerce law was enacted it was thought that the sharp practices of these departments would be done away with and that an era in which straightforward business methods would prevail would inaugurated.

It no doubt did act as a determent for a short time, but the competition becoming greater and greater through the construction of parallel and competing lines, built not because they were needed, but because there was money to be made in their construction, stimulated the agents of the respective lines, so that the old methods of rebate, false billing, undue commissions, etc., again prevail to an alarming extent, practiced often directly without reference to the law, but more frequently indirectly to evade the law. "Trick and device" is the order of the day, openly acknowledged with the excuse that roads could not exist unless they did so, as their competitors were doing it, and if they acted otherwise such competitors would get the business.

It is true that traffic associations have been established, division of traffic and maintenance of rates agreed upon, but on account of the bad faith of some of the high contracting parties, results have been unsatisfactory, and many of the associations have broken up.

Through a persistence in the foregoing methods revenues have been decreased so largely on many roads that they were forced to economize to enable them to pay interest on funded debt, and, as a sequence, rotten ties, worn out equipment and rails prevail to such an extent in some sections that the safety of the traveling public is jeopardized. Through the medium, however, of receivers and their certificates it is hoped that such roads may be put in good condition, and yet this is at the expense of the stock and bondholders.

The maintenance of reasonable rates and a fair division of traffic between competing lines, it is generally admitted, are essential to the existence of the majority of the roads, and since the Interstate commerce law and agreements heretofore made have proved ineffective, why not tentatively use some other method or methods? Divisions of traffic between competitive points have been agreed upon from time to time by roads and associations in such manner that they seemed to be conclusive in theory, no object for cutting rates being apparent; but not so in practice. In fact it has been found by experience that roads which have had to transfer traffic to competitors continuously will demand greater percentages of the traffic, notwithstanding this condition of affairs is brought about generally by the activity of unscrupulous soliciting agents, who increase the traffic of their respective lines by "trick and device" in violation of law and agreements, and who thereby decrease the revenue to the advantage of a portion of the patrons and to the disadvantage of another portion.

It follows that, if there is an arrangement at each competitive point whereby soliciting agents can be abolished and the traffic be distributed daily upon agreed percentages, and whereat there would be a representative of each line, there would be full knowledge of the whole business for all interested, and the incentive for obtaining traffic by illegal or indirect methods would be removed. In other words, joint agents should be appointed. For example, if a station is located on three roads, the three agents should elect one of their number as the joint agent and the other two act as his assistants; thus the three lines would be represented and each would see that his own line was protected in its rights. The freight not routed by the shippers and the passengers who would be indifferent thereto would always be sufficient to enable the joint agent to even up the percentages. Indeed, it is probable that when shippers and passengers find that there is nothing to be gained by using any specific route, they will be entirely indifferent. If, however, under these natural conditions, it should appear that the public preferred any line to a greater extent than the percentages indicated, then new percentages could be justly arranged. Of course non-competitive traffic could be treated directly, as usual, by the representative lines, separate reports thereof being made to each line in interest.

One great advantage of this method of distribution would be that the whole competitive business would be open for inspection, at all times, to the parties interested and their representatives cognizant of every transaction. No statements made subject to the suspicion of being inaccurate, designedly or otherwise, would be a factor in the adjustments between the lines. Furthermore, this plan need not be put in operation in extenso at once, but may be placed on trial first at one agency, and if successful at another, and so on in turn.

The result of the foregoing would be the maintenance of rates and a great saving in expenses, caused by the abolition of soliciting and contracting agencies, and a de-

crease in the cost of advertising and printing besides, and the merchants and manufacturers of the locality would be all on an even keel as to business, all having the same rates—freight and passenger. There also might be a reduction in freight train service, as the proportion of any given line might be forwarded in trains with the maximum number of cars, loaded to their full capacity.

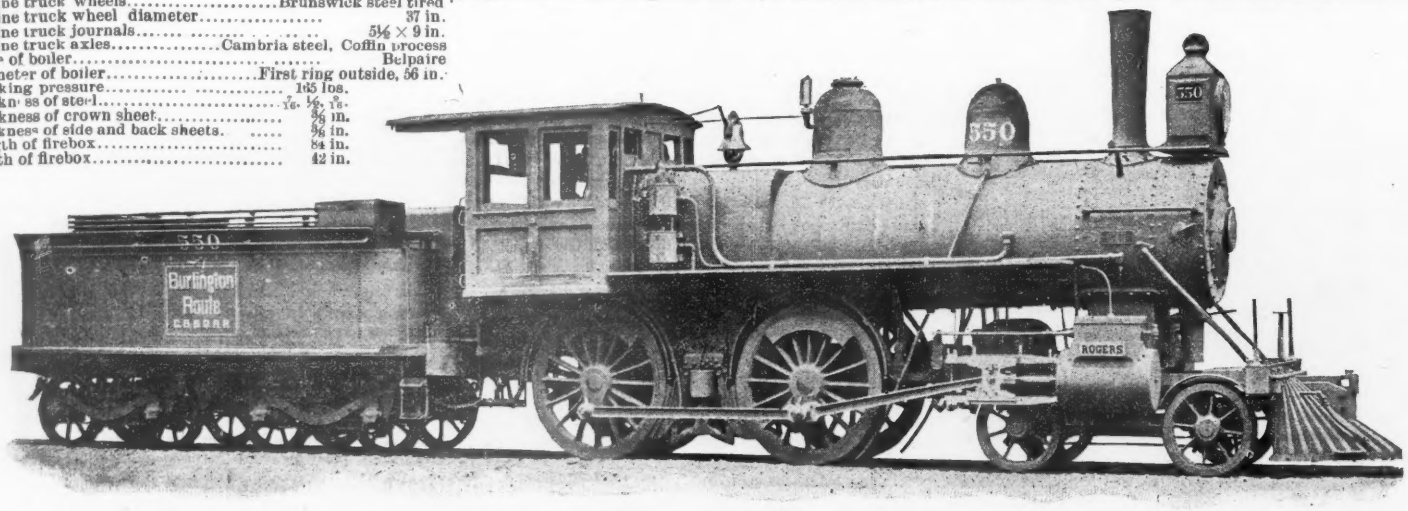
This plan did not originate with me but has been formulated by two railroad men of known reputation, and favorably commented on by several presidents and managers.

C., B. & Q. Class "M" Locomotive.

The illustration represents an eight-wheel, American type locomotive, built by the Rogers Locomotive & Machine Works for the Chicago, Burlington & Quincy Railroad. This is the standard class "M" locomotive of the road, one of which was tested last year in heavy fast passenger service in competition with the Baldwin Locomotive Works' engine No. 82 and two of the Chicago, Burlington & Quincy class "H" locomotive. The results of these tests are given in the paper read by Mr. William Forsyth before the Western Railway Club at their meeting last February.

In consequence of the very favorable showing of this locomotive in these tests it has been decided to make it standard for fast passenger service on this road, and quite a number have been recently built for this service. We give below a few of the principal dimensions of this engine:

Diameter of cylinders	18 in.
Stroke of piston	24 in.
Piston rod diameter	3¼ in.
Piston rod packing	Jerome metallic
Size of steam ports	14¼ × 1¾ in.
Size of exhaust ports	17¼ × 3½ in.
Slide valves	Robertson's balanced
Maximum travel of valves	6 in.
Outside lap of valve	⅞ in.
Inside clearance of valve	1/16 in.
Lead in full gear	1/16 in.
Valve steam packing	Jerome metall c
Driving-wheel diameter	69 in.
Thickness of driving-wheel tire	3½ in.
Driving-wheel journals	8 × 9½ in.
Driving axles	Cambria steel, Coffin process
Engine truck wheels	Brunswick steel tired
Engine truck wheel diameter	37 in.
Engine truck journals	5½ × 9 in.
Engine truck axles	Cambria steel, Coffin process
Style of boiler	Belpaire
Diameter of boiler	First ring outside, 56 in.
Working pressure	165 lbs.
Thickness of steel	7/16, ½, 9/16
Thickness of crown sheet	⅜ in.
Thickness of side and back sheets	5/16 in.
Length of firebox	84 in.
Width of firebox	42 in.



Standard Fast Passenger Engine, Class M—Chicago, Burlington & Quincy Railroad.

G. W. RHODES, *Superintendent Motive Power.* *Built by the* ROGERS LOCOMOTIVE & MACHINE WORKS, *Paterson, N. J.*

Water space around firebox	3 in.
Horizontal seams	Butt jointed
Circumferential seams	Double riveted lap
Thickness of tube sheet	½ in.
Material in tubes	Iron
Number of tubes	217
Outside diameter of tubes	2 in.
Length of tubes over sheet	11 ft. 6⅛ in.
Heating surface of tubes	1,308 sq. ft.
Heating surface of firebox	110 sq. ft.
Total heating surface	1,418 sq. ft.
Grate area	21⅛ sq. ft.
Style of grate	Rocking finger bar
Exhaust nozzles	Single, high
Minimum smokestack diameter	13 in.
Smokebox	Extension front
Weight of tender ready for service	72,000 lbs.
Diameter of tender wheels	37 in.
Tender wheels	Brunswick steel tired
Tender axles	Cambria steel, Coffin process
Tender axle journals	4¼ × 8 collarless
Tender frame	White oak
Tender truck	Rogers' passenger standard
Water capacity of tank	3,480 gals.
Fuel capacity	7 tons
Driving wheel base	8 ft. 6 in.
Total wheel base of engine	22 ft. 11½ in.
Total wheel base of engine and tender	48 ft. 2 in.
Total weight of engine	102,000 lbs.
Total weight on drivers	65,500 lbs.
Weight on truck	36,500 lbs.

The Work of the New York Dock Department.

In view of all that has appeared in the New York daily papers during the past month or two concerning the operations of the New York Dock Department and the proposed extravagant expenditure of enormous appropriations for work upon the city's water fronts, a brief consideration of the real methods of operation followed by the department may not be untimely.

When the Dock Department was organized in 1870 it was authorized by legislative enactment to make a new plan for the improvement of the river fronts of the city of New York. Such a plan was prepared, and was, in part, approved in 1871 by the Sinking Fund Commission approval by this commission of any proposed work being then, as now, necessary in every instance before the actual work of construction can be undertaken. Since that year the Dock Department has, from time to time, made new plans for certain sections of the whole work, and, with the sanction of the Sinking Fund Commission, has carried them out, in part.

It does not follow, however, that if a plan be authorized by the legislature and approved by the Sinking Fund Commission, it will be completely carried out at once, since there are always many difficulties, such as title disputes, for example, to be adjusted before the work can be taken in hand. Execution of a plan is, therefore, necessarily less rapid than may be popularly supposed, and of the total sums involved only a relatively small portion is annually allowed, and, in part, expended. As a matter of fact the utmost expenditure that can be made by the Dock Board in one year is $3,000,000, and this annual appropriation was authorized more than 20 years ago when the Board was first organized. What proportion of this sum actually has been expended during each of the years since May, 1870, is shown in the table below, from which it will be seen that the largest amount thus far disbursed was during the year ended last April, having reached $2,762,566, while the smallest expenditure, $373,425, was incurred during the year which ended in April, 1879. During the whole 23 years of the Dock Department's existence the total expenditures, including everything, such as salaries, bills and claims on construction and repairs, money paid for property acquired by the city, etc., amounted to only $22,781,153, while the total revenue from leased wharves and wharfage during the same time figured up $23,204,454. The impression, therefore, which there has been an attempt to create, that vast sums may be, and are, appropriated for almost immediate disbursement is entirely without real foundation. As already said no more than $3,000,000 is legally available each year, and the records of the Dock Department show that this maximum annual amount has never yet been used.

To what purposes the $3,000,000 appropriation will be put during the coming year, aside from the payment of judgments rendered against the department as a result of condemnation proceedings to acquire for the city the ownership of the water front, will be seen by a brief outline of the work to be carried out.

From Pier 1 at Battery Place to Liberty street on the North River front probably no actual work will be done Twelve piers in this section are held by private owners, and condemnation proceedings are now in the courts to secure this property for the city. From Liberty to Dey street work is being prosecuted on the dock wall, and the gap between the wall and the old bulkhead line is being filled in. From Dey to Barclay street the work is finished; from Barclay to Warren street there is a gap, work on part of which will probably be completed during the year. The bulkhead between new Pier 19 and old Pier 28 in this section has been bought from the Old Colony Company, and the improved property will be leased back to them; between this property and Barclay street the water front belongs to a private estate, and condemnation proceedings are now in progress to secure it for the city. From Warren to West Eleventh street the work is finished, except at the Desbrosses street ferry, which is owned by the Pennsylvania Railroad Company. All the rest of the water front in this section belongs to the city.

Right here it may not be amiss to state that for some time past efforts have been made for the enactment of a law which would intelligently provide for the improvement of water front property held by private owners, at the expense of such owners, the bulkheads to be built under the supervision of the Dock Department, while the piers might be built by the owners themselves, who would be allowed to reap the revenues resulting from the improved property. A bill, recently passed by the legislature, designed to effect this object has, however, proved generally unsatisfactory in its provisions and it is not likely that anything will be done under them. Better expectations are entertained of a new bill, which may be presented and passed next year.

The plan of improving private water front property at the expense of its owners, leaving it in their possession, and of granting them the resulting benefits in the shape of revenues, would seem to have several commendable features. The delay now incident to the condemnation proceedings would be entirely avoided. Besides this, the annual appropriation of the Dock Department would be relieved from the comparatively heavy drafts hitherto made upon it by the judgments for condemned private property, and the whole amount would thus be left available for actual work of construction. What this would mean is at once apparent. Much time would be saved, more rapid progress would be made in the work of improvement, and there would be less occasion than there has been for charges that the Dock Department work was proceeding too slowly.

Then, again, the existence of private water-front property, which the plan would permit, would have a healthy influence on the revenue from leased wharves, and would beneficially counteract the tendency to steadily decreasing wharfage rates which would, in all likelihood, arise if all the water-front property were city property. With a suitable law favoring the plan, condemnation proceedings now in progress and under consideration might possibly be abandoned with much satisfaction and profit to all concerned.

Returning from this digression to the review of the construction work mapped out by the Dock Department for the ensuing year, it should be stated that from West Eleventh to West Twenty-third street nothing has yet been done, but special interest will be attached to the improvement which has been planned for that portion of the river front.

As far back as 1880 a report was submitted to the Board of Docks by the Engineer-in-Chief in regard to the improvement of this section. By the early general improvement plan of 1871 piers were established between the Battery and West Eleventh street, at distances of from about 150 to 180 ft. apart, and above West Twenty-third street piers were established at distances of about 200 ft. apart. In the section between West Eleventh and West Twenty-third street, however, on account of the narrowness of the river, it being directly opposite Castle Point at Hoboken, and on account of the filling having been extended upward of 1,000 ft. from the original high water mark into the river, very few piers were provided, and a long stretch of straight bulkhead, without piers, was a feature of the plan.

The improvement proposed in 1880 was, in brief, to purchase the property west of West street, extended in a straight line from West Eleventh to West Twenty-third street, to remove all the buildings on it, and to build 21 large, new piers in place of the buildings and filling to be removed. Legislative authority for this plan was not secured, even though it promised important advantages to the city by increasing the wharfage room on that section to about 23,000 ft., as compared with 7,600 ft. provided by the plan of 1871. The plan was again brought forward in 1888 with a similarly unsuccessful result.

Now, however, the necessary authority has been given by the legislature for a modification of the plan of 1880, which was made necessary by the establishment and building of the new West Washington Market. In accordance with this modified plan, presented by Engineer-in-Chief G. S. Greene, Jr., last March, there will be 19 large piers and two half-piers, one on each side of the new market, and two small piers, about 160 ft. long, directly in front of the market, the total estimated cost of the proposed improvement being in round numbers $11,000,000. The additional cost of the proposed new plan over that of 1871 is a little over $9,000,000. The annual income that can be derived from this section of the water front, improved as proposed, is placed at $807,000, representing about seven per cent. of the total cost of the projected work. But the advantage to the city which such an improvement would entail is much greater than the simple money return on the invest-

ment, and is so great, in fact, that it would be difficult to overstate it. The plan now needs the approval of the Sinking Fund Commission before anything further can be done with it.

From Twenty-third street to Thirty-fourth street the work of improvement has been completed, and one noteworthy result has been the use of piers in that section by a number of steamship lines which previously did not dock in New York. Between Thirty-fourth and Forty-third street no work has yet been done. Between Forty-third and Forty-fourth street operations are being actively carried on and will probably be finished before the end of 1893. Probably only two new piers will be built on the North River front this year, viz., new Nos. 19 and 22. Work on extending the pier new No. 38 for the White Star Line is now in progress. Plans have also been made, and will be taken up, to improve the section from West Seventy-second to 100th street.

The work on the East River front, projected for the current year, comprises the building of a pier at Stanton street and the completion of the sea wall for several hundred feet south of that pier, and also from Twenty-fourth to Twenty-eighth street. Work has also been prosecuted on short sections at Ninty-fourth, One Hundred and First, One hundred and Tenth and One Hundred and Twenty-fifth streets. In addition to the pier at Stanton street, another will be built at Ninty-first street. A smaller one is being constructed at Canal street on the North River.

It is noteworthy that all the work is being done by the Department's workmen, and not by contract. This system, according to President J. Sergeant Cram, of the Dock Board, has been found to work well and economically, the plant of the Department being the growth of years, and particularly adapted to that class of operation.

As to the revenues and expenditures of the Department from the date of its organization in May, 1870, to April, 1893, the appended table, to which reference has already been made, is of interest. In this the total annual expenditures include the salaries of the commissioners, of the engineer-in-chief and his subordinates' the secretary of the commissioners, clerks, dockmasters, etc., stationery and incidentals of the commisioners, office, bills and claims audited on construction, including labor pay rolls, bills and claims on general repairs, including labor pay rolls and the sums paid for property acquired by the city.

REVENUES AND EXPENDITURES, DEPARTMENT OF DOCKS, NEW YORK, FROM ITS ORGANIZATION IN MAY, 1870, TO APRIL 30, 1893.

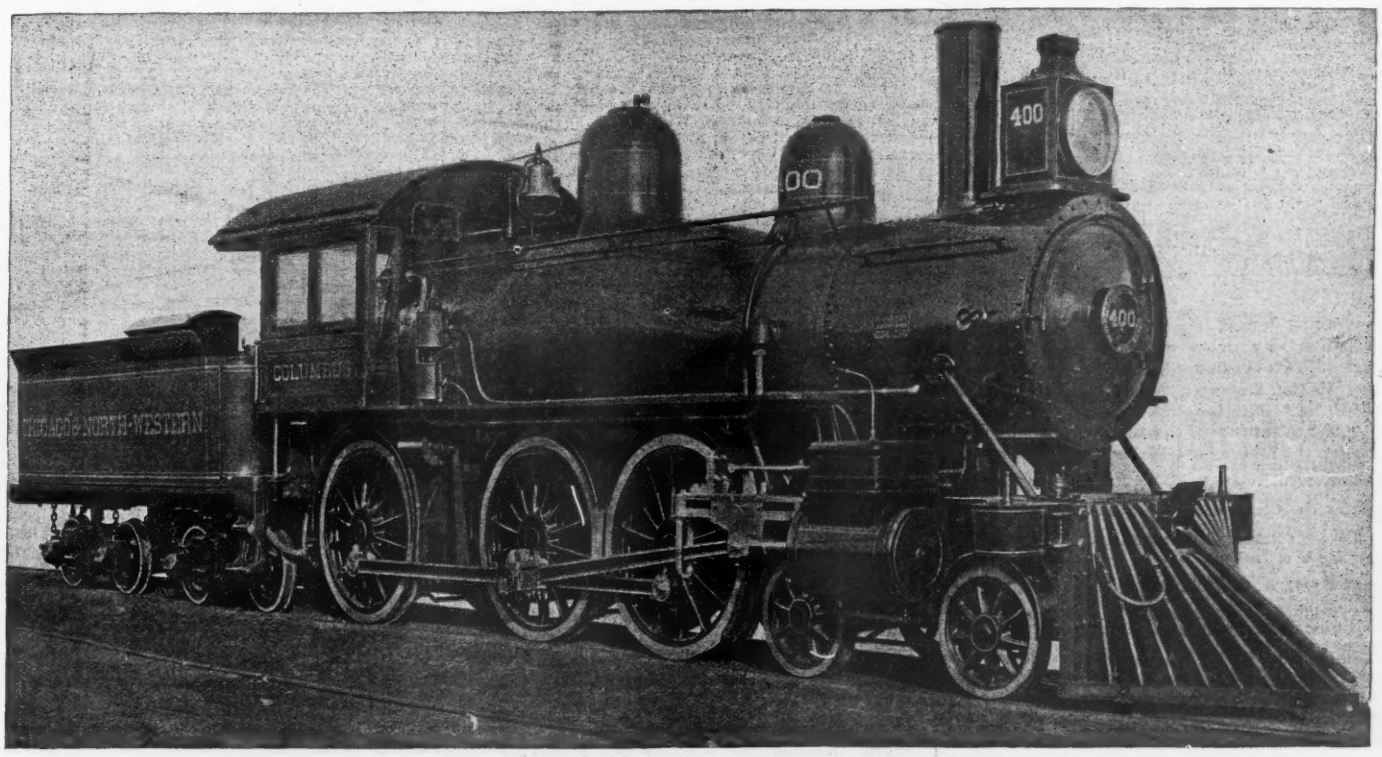
Years ending April 30.	Gross revenue—leased wharves and wharfage.	Annual expenditures audited.
1871	$315,524.54	$486,449.12
1872	412,859.93	1,075,605.61
1873	447,328.01	632,878 03
1874	479,361.51	934,710.32
1875	589,3 1.06	1,536,204 33
1876	650,781.88	692,604.96
1877	706,607 78	433,089.90
1878	853,816.92	486,934.69
1879	782,122.37	373,425 68
1880	810,465 41	599,768.63
1881	845, 71.89	640,481 57
1882	1,062,162.54	1,180,097.44
1883	1,162,893.96	953 007 85
1884	1,246,858.19	760,106 80
1885	1,187,217.14	1,020,207.51
1886	1,228.151.80	376,789.72
1887	1,260,036.58	389.169.82
1888	1,320,654.81	1,099,548.62
1889	1,418 440.62	1,218,483.76
1890	1,487,930.71	1,316,370.65
1891	1,508,551.93	1,971,841.84
1892	1,632,437.70	1,832,823.63
1893	1,765,783.65	2,762,566.00
Total	$23,204,453.93	$22,781,158.48

Schenectady Passenger Engine "Columbus."

In the accompanying engraving, which represents a passenger locomotive recently built by the Schenectady Locomotive Works for the Chicago & Northwestern Railway, we have another example of the tendency on western roads toward the use of six-coupled engines for passenger service. This engine is one of four built by the Schenectady Locomotive Works and now on exhibition at the World's Fair, the other three engines of the exhibit consisting of a 12-wheel freight engine for the Duluth & Iron Range R. R., a compound consolidation for the Mohawk & Malone Railroad, and a six-wheeled switching engine intended to embody the best features of design and construction for this class of service.

The "Columbus" is a simple engine, with an extended wagon-top boiler, radial stay, and designed for the use of bituminous coal, and to carry a working pressure of 170 lbs. of steam per square inch. The following are some of the principal dimensions of the engine;

Diameter of cylinders	19 in.
Stroke of piston	24 in.
Thickness of piston	5¼ in.
Piston-rod diameter	3½ in.
Piston-rod packing	Sullivan metallic
Size of steam ports	18 × 1¼ in.
Size of exhaust ports	18 × 2¾ in.
Width of bridges	1⅛ in.
Slide valves	American balanced
Maximum travel of valves	5½ in.
Outside lap of valves	⅞ in.
Inside " "	1/32 in.
Lead in full stroke	1/16 in.
Valve stem packing	Sullivan metallic
Driving wheel diameter	67 in.
" " journals	7⅛ × 8½ in.
Engine truck	4 wheel, rigid centre
Engine truck wheels	Washburn steel tired spoke centre
Engine truck wheel, diameter	33 in.
Engine truck, journals	5 × 9 in.



SCHENECTADY COMPOUND LOCOMOTIVE "COLUMBUS"—CHICAGO & NORTHWESTERN RAILWAY.

Style of boiler	Extended wagon top
Diameter of boiler, 1st ring outside	60 in.
Thickness of steel	9/16 in.
Maker of steel	Wellman.
Horizontal seams	Sextuple riveted, butt joints
Circumferential seams	Double riveted
Length of firebox	77½ in.
Width of fireboxes	33 in.
Depth of fireboxes	84 in.
Thickness of crownsheet	⅜ in.
Thickness of sidesheets	⅜ in.
Thickness of back sheets	⅜ in.
Thickness of tube sheet	½ in.
Maker of firebox steel	Schoenberger
Water space, front	4 in.
Water space, sides and back	3½ in.
Diameter of crown stays	1 in.
Material in tubes	Charcoal iron
Number of tubes	268.
Outside diameter of tubes	2 in.
Thickness of tubes	No. 11 W. G.
Length of tubes over sheet	12 ft. 6 in.
Heating surface of tubes	1,642.3 sq. ft.
Heating surface of firbeox	164 sq. ft.
Total heating surface	1,806.3 sq. ft.
Grate area	17.8 sq. ft.
Style of grate	Rocking
Exhaust nozzles	Double
Throttle	Balance valve, double poppet
Weight of tender, empty	32,900 lbs.
Diameter of tender wheels	33 in.
Tender journals	4½ × 8 in.
Water capacity of tank	4,000 gal.
Coal capacity	7 tons
Driving wheel base	14 ft. 11 in.
Rigid wheel base	9 ft.
Total wheel base of engine	25 ft. 3 in.
Total wheel base of engine and tender	47 ft. 9½ in.
Total weight of engine	120,000 lbs.
Weight on drivers	96 000 lbs.
Weight on truck	33,000 lbs.

The engine is provided with the double poppet balanced valve, designed by Mr. A. J. Pitkin, and illustrated in the *Railroad Gazette* of April 14, 1893. The tender frame is of the Schenectady Locomotive Works standard, 6½×4 in.×4¾ angle iron. The tender trucks are of the ordinary four wheeled channel iron type with centre bearing front and back, and side bearings on back truck.

The Master Car Builders' Convention.

The twenty-seventh annual convention of the Master Car Builders' Association held its first meeting at Lakewood, N. Y., on Tuesday, June 13, with an attendance of about 100 members. The convention was called to order by its President, Mr. E. W. Grieves, of the Baltimore & Ohio, at about 10 o'clock, and the regular order of business taken up. At the roll call not more than one-half of the members answered to their names, but many who were present at Lakewood were not in attendance at the first meeting of the convention. The usual motion was entertained to dispense with the minutes of the last meeting since they had already been published in the annual report. The convention then listened to the address of the President.

ADDRESS OF PRESIDENT GRIEVES.

. . . Since we last met in convention five of our members and associates have ended their mortal existence and gone to that bourne whence no traveler returneth; they are: Theodore Bergold, G. H. Gramling, Robert Hitchcock, D. H. Neale and John Ortton, all more or less known to many of you.

I need hardly dwell upon the progress made during the past year; with this you are all familiar; but will simply touch upon some leading points . . . We, as an association, take it with no little satisfaction and without egotism when we say that the results of our labors in the past have been shown to be beneficial in a marked degree, as we look upon the equipment of the present, and we have good reason to hope that the future will bring further advancement in the same direction.

The Columbian year has been one of the greatest importance to this association, as all railroad companies have been spurred to improvement in equipment and an increase in the safeguards connected with transportation. The subjects we handle are of such import as to have called for legislation, not only on the part of states, but on the part of the National Government, notably the recent passage of what has been known as the Coupler Bill, carrying with it the application of the automatic brake, which is a measure that will have an important bearing on railroad policy during the next four or five years. It is gratifying to know in this connection that if legislation seemed necessary, the past work of this association has, in a measure, been indorsed by the character of such legislation; and owing to the large number of freight cars already equipped with automatic brakes and couplers, according to the standards adopted by this association, called forth by the demand of railroad companies for such appliances, this must necessarily have a strong influence upon, if not to act entirely in the determination of what type of brake and coupler shall finally come into general use, in compliance with the law just enacted.

It was left to the American Railway Association to fix upon a proper height for freight car drawbars that should become the standard of the country. Thirty-four and a half inches has been chosen as the maximum height and 32½ in. as a minimum, leaving 33 in., the standard adopted by our Association, the average.

There has been a steady increase in the use of pressed steel in car construction, an important feature of which is the pressed steel truck which one trunk line has adopted as its standard form of truck. Railroad companies are everywhere responding to the demand for increased strength in car construction, required by the heavy traffic of to-day, the fast time made and the handling of heavier trains. With the opening up of new territory and the establishment of additional through lines, there has been a constant growth in the business of interchange, thereby enhancing the importance of the M. C. B. rules of interchange for both freight and passenger cars. . . . Our committee work is all important, and particular importance attaches to the work of the committees appointed last year to review the standards of the Association and suggest any changes found necessary.

Ours is a high calling. Divine Scripture saith, "No man liveth to himself;" and whatever results attend our efforts will result in benefit to humanity. Few are

living to-day who participated in the first convention of this Association, and yet the approved methods now in use had their beginnings in the endeavors of those who were the early promoters of association work. With the thought in view that whatever plans we make are to be perfected by those who follow us, let us be conscientious in the performance of our duty, and devot e to our work all the intelligence God hath given us.

The report of the Secretary showed a total membership of 328 members as compared with 305 last year. The membership is divided into active members 192, representative members 130, associate members 6. This makes an increase of 11 railroad companies which are representative, and a change in the number of representatives from roads; two active and an associate member have died. The names of 13 new active members have been added to the list. The number of cars reported as represented in the Association last year was 1,072,748, while the recent reports for this year show that there are now represented 1,123,339 cars, or an increase of 50,591, of which increase 22,189 cars represent the increase of cars owned by railroads formerly representative, and the balance, 28,402 cars, are owned by the new representation of the Association. In consideration of this it should be stated that many railroad companies have failed to report their revised numbers of cars this year. The Secretary reported since his last report and up to June 6, 1893, the following collections of cash:

Dues from members	$6,049.00
Sales of rules of interchange	656.67
Sales of reports of proceedings	193.00
The sale of airbrake and signal instructions	443.49
" " " arbitration cases	26.93
" " " electros and blueprints	29.10
" interest on bank balances	25.16
Total	$7,423.35

The disbursements in the same period were:

By printing report of proceedings	$1,178.80
" " letter ballots	20.25
" " rules of interchange	415.70
" " airbrake and signal instructions	340.95
" " miscellaneous	522.20
" " electrotyping	177.61
Paid R. W. Ryan, reporting convention	165.12
Secretary's salary, June, 1893, including office rent and clerk	3,000.00
Paid exchange	27.05
By paid expenses, rooms at Saratoga	11.66
" " express and customs	6.73
" " stamps and stamped envelopes	220.91
" " stationary	16.40
" " telegrams	24.42
" " expenses of members of executive and arbitration committee during year	60.10
By paid tracings and blueprints	48.50
" " balance remitted to treasurer	1,186.95
	$7,423.35

The arrears of unpaid dues reported are $717, a statement of which was posted with the amounts due the Association. This amount of $1,186.95, paid over by the Secretary to the Treasurer makes a net surplus in the treasury of the Association of $5,452.96.

The President announced the following committees:

Nominating Committee:—W. H. Day, L. Packard, W. H. Harrison, W. L. Hoeffecker.

Committee on Subjects:—A. M. Waitt, R. E. Marshall, S. A. Crone.

Committee on Correspondence:—Wm. McWood, E. M. Roberts.

COMMITTEES ON OBITUARIES.

On the death of Theodore Bergold:—Samuel Irvin, James McGee.

John Orton:—C. H. Cary, M. M. Martin.

G. H. Gruning:—E. M. Roberts, W. H. Day.

Robert Hitchcock:—F. D. Adams, J. T. Chamberlain.

D. H. Neale:—H. G. Prout, A. E. Mitchell.

A member of the committee reported the death of Mr. M. V. McVail, and the President announced that he would appoint a committee later to take action upon this gentleman's death. The next order of business was the election of an auditing committee, and the following gentlemen were nominated and the Secretary directed to cast the ballot of the Association for them: Mr. William McWood, Mr. A. E. Mitchell, Mr. L. Packard.

The Secretary next read two invitations—one a tender of an excursion to Oil City, Pa., to stop at Meadville and Franklin, which was made by Mr. A. E. Mitchell, Superintendent of Motive Power, New York, Lake Erie & Western Railroad Company, on behalf of his company to the Master Car Builders' and Master Mechanics' Associations for Saturday, June 17. This communication was received and the invitation unanimously accepted. The other, a communication from the New York Central & Hudson River Railroad, who, through the co-operation of the Chautauqua Steamboat Company, extended an invitation to an excursion to the members of the conventions through their General Master Mechanic, Mr. F. Vail, said excursion to be from Lakewood to Niagara Falls, the day to be agreed upon by the two associations. The latter invitation was left in the hands of the committee to arrange with the Master Mechanics' Association.

Under the order of new business Mr. A. M. Waitt submitted a new arrangement for the location of the dummy coupling hook for freight cars equipped with air brakes together with a blueprint showing the device, with the expressed wish that it should go before the Association as a modification of the present standard location and arrangement for dummy coupling hooks. It was contended that the present location made the hose a convenient step for persons in passing over from one side of a train to the other. The coupling as now hung was reported to cause kinking and cracking, and as being in such a position as to be damaged by lumps of coal or ore falling off the car. The new hanging proposed will obviate these difficulties. It has been used on several railroads for nearly a year, and has given excellent satisfaction, and is recommended by several prominent car builders. This was referred to a special committee, the committee being Messrs. Marshall, Waitt and Higgins.

The report of the Committee on Attachments of M. C. B. Couplers was next read by its chairman, Mr. E. D. Bronner. The report, at much length, follows:

ATTACHMENTS OF M. C. B. COUPLERS TO CARS.

Your committee was commissioned: "To recommend a form in detail of M. C. B. coupler at rear, so as to take yoke, tail bolt and continuous drawbar attachments; also to consider and report upon the best form of draft attachment to cars. To confer with 'Committee on Tests of M. C. B. couplers.'"

Circulars of inquiry were sent out, and replies were received from 45 members, representing about 620,000 cars, and also from about all of the coupler and draft device manufacturers.

The first portion of the work of your committee was to design for recommendation a standard tail end for the M. C. B. coupler. From the information received from members of the Association, it would appear that a solid end is preferred by a large majority. For the reason also that a single piece is usually preferable in mechanics to two or three pieces, we would recommend for adoption the form of the dimensions shown on figs. A and B. These dimensions appear to be in general use where the solid end is used, as shown by the drawings furnished your committee by the railroad companies and by the coupler manufacturers. Nearly all of the users of the yoke attachment are employing rivets from 1 to 1⅛ in. in diameter for securing the yoke to the coupler, and as the representatives of the largest number of cars are using rivets in 1⅛ in. in diameter, your committee has recommended the rivet holes to be 1$\frac{3}{16}$ in. in diameter and the rivets to be 1⅛ in. in diameter.

Practically all of the users of modern continuous draft rigging are using an equalizer 1 × 5 in. through the shank of the bar. Your committee has therefore recommended an opening, or slot, in the shank of the coupler to accommodate the size of equalizer, as shown (1⅛ × 5⅛ in.).

In regard to the portion of the design referring to the tail bolt, your committee finds that the representatives of 343,196 cars have answered that the yoke attachment is their standard. Representatives of 197,201 cars have said that the tail bolt is their standard. Representatives of 72,224 cars have adopted the continuous as their standard attachment. Among the representatives of the 197,201 cars having the tail bolt as their standard, members representing 172,153 cars have signified to your committee that they consider the tail bolt the weak point of their draft rigging, and that they intend to adopt the yoke, or are aiming to devise a draft rigging which will enable them to use the yoke or tail strap attachment for the coupler. The adherents, therefore, of the tail bolt would appear to be in a hopeless minority. This being the case, the application of M. C. B. couplers with the tail bolt attachment must soon cease. Your committee, has therefore not thought it advisable to recommend any change in that portion of the design, even though it is convinced that the two-inch diameter tail bolt which it will now take, and which is the size it finds almost universally used with the M. C. B. coupler, is weak and inefficient.

In figs. A and B we show two drawings, one for use with yoke, or tail bolt, and one including slot in shank for continuous draft rigging. On account of the *comparatively* small number of roads using the latter device, your committee has not thought it advisable to recommend for adoption a design adapted for all three devices. It would, therefore, recommend that both designs go before the Association, with a view of adopting both designs as standard, or the one including slot, or opening, for continuous draft rigging.

In regard to that portion of the instructions in which the committee is requested "to consider and report upon the best form of draft attachment to cars," it will first show the recommendations formerly made by the Association, and the standards already adopted bearing upon the subject.

First.—Standard height of drawbars, top of rail to centre of drawbar, 33 in.

Second.—Showing recommendations made by the Association in regard to the "attachment of the drawbars at their rear end."

Third.—Showing standard dead-blocks and location of same.

Fourth.—Recommended capacity of draw sp rings and buffer springs, not less than 18,000 lbs.

Fifth.—Plate IV., showing standard M. C. B. coupler. Length 30 in., length 28 in. for repairs; size at neck 5 × 5 in.; tail end; standard carrying iron 5⅛ × 5¾ in.

Sixth.—Plate V., showing maximum and minimum limits for dimensions of standard M. C. B. coupler.

We will now take up the various standards and recommendations referred to above by numbers, first to sixth inclusive.

First.—This standard is now being investigated by another committee.

Second.—The committee finds that the recommendations herein set forth are practically a dead letter, excepting possibly the diameter of the tail bolt and the thickness of the followers. We find, however, that the designs furnished your committee by the greater number of members, representing the greater number of cars, are evolutions or improvements of this type of draft rigging. Almost all the designs differing radically from the general type are patented devices, and could not, therefore, be recommended as substitutes for it. Your instructions do not cover the recommendation of a standard attachment, but in view of the universal disregard of the present recommendations, we conclude to advise their abandonment and the substitution of a plan of the same general type but of more modern design. (See fig. C.)

Third.—The committee finds the same state of affairs in reference to this standard as shown in the foregoing one. Only one representative has stated that he was using the M. C. B. standard buffer blocks with the M. C. B. coupler. Therefore, if a standard drawing is to be shown, it should be more in accord with what is being used with the M. C. B. coupler.

The principal reasons, we infer, leading the users of buffer blocks to disregard the standard are that it is too short (measured in a line parallel with the rail) to be effective with the M. C. B. coupler, and if located according to the standard, the corners would come in contact with the M. C. B. coupler. Your committee, in its circular of inquiry, asked for information and opinion as to the use of buffer blocks, considering this in the line of their duty on account of the relation buffer blocks bear to attachments proper. The information received has developed a curious state of affairs. The representatives of but 98,707 cars say they are using buffer blocks with M. C. B. couplers, while representatives of 489,009 cars say they are not. Yet, out of the latter number the representatives of 132,917 cars say that, in their opinion, the buffer blocks are of advantage and should be used. Therefore, the representatives of 356,089 cars have expressed an opinion against buffer blocks, and of 231,624 cars for them.

Among opinions presented by members as to value of buffer blocks with M. C. B. couplers, the following are examples:

(*a*) "With M. C. B. couplers, if they (dead-blocks) are made so as to come together before draft spring is exhausted, it will interfere with coupling. If not so located, they are of no use."

(*b*) "We think if iron dead-blocks were of advantage with old link and pin coupler, as almost universally used in the East, there can be no question of their being of much greater advantage to the M. C. B. coupler. An automatic coupler does not make as good a buffer as a non-automatic, and requires something to protect it. The horn, or bracket, which has heretofore been depended upon, does not meet the case. It is simply a makeshift used by Western roads because they could not withstand the popular cry against the 'man-killer.' Now, however, that automatic couplers are being introduced, doing away with the necessity of trainmen going between the cars, there can be no objection to the iron dead-blocks. They should by all means be applied. They will save the chucking back and forth of the draft rigging, which brings such severe strains on the attachments as to finally cause them to rupture, and allow them, either through the blow or excessive lost motion, to break, or else to pull out and drop on the track."

(*c*) "Dead-blocks, if efficient, would prevent coupling on curves."

(*d*) "If made long enough to suit two cars, both equipped with M. C. B. couplers, they cannot be brought into play when one car so equipped is coupled to another car with the ordinary type of drawhead, and with dead-blocks suitable to that drawhead. If, on the other hand, the cars equipped with M. C. B. couplers are also equipped with dead-blocks having sufficient projection to come into play when such a car is coupled to a car equipped with the ordinary drawhead and dead-blocks to suit this drawhead, the dead-blocks on the car equipped with M. C. B. coupler will be too long to permit the coupling of two cars with M. C. B. couplers."

(*e*) "On account of the strain being practically removed from the draft rigging when cars are subjected to heavy buffing, and being distributed through the different members of the floor framing, our rigging and the dead-blocks are so designed that the dead-blocks of two cars coupled together will strike before the draft springs become solid, thereby reducing to a minimum the liability of breaking the draft spring; when coupling to a car equipped with a link and pin, it is a safeguard for a man making the coupling."

Some members have expressed the opinion that they were dangerous to life and limb, and others, that they saved life and limb.

In view of the recent act of Congress, compelling railroad companies engaged in interstate commerce to equip their cars with automatic couplers, it appears to your Committee that the question of danger in the use of the double buffer blocks will soon be eliminated from the problem.

The question, as it remains, will then be this:

1. Can the buffer blocks be applied with automatic couplers, so as to relieve the draft gear from the severe buffing strains and carry the shock to the line of greatest resistance without interfering with the practical operation of the coupler under ordinary conditions?

2. If it wholly or partially accomplishes this purpose, will the saving effected be sufficient to balance the increased cost?

In regard to the first proposition, we find that the testimony of those using the double buffer blocks is to the effect that they can be so designed as to relieve the draft rigging from the severe shocks of coupling and running up of slack in trains, and still not interfere with coupling operations on curves. Your committee has also made some experiments and finds no difficulty in making couplings under any circumstances in connection with curves as sharp as 38 deg., even when gears are old and couplers have been driven back so that the inner face of knuckle projects but little over 1 in. from face of buffer blocks.

In discussing the second proposition, it is obvious that a buffer block cannot be designed to meet all the conditions at the present stage of the M. C. B. coupler. The Committee will therefore confine itself to the value of buffer blocks in connection with M. C. B. couplers meeting M. C. B. couplers only. In view of the recent enactments of Congress and the various state legislatures, and the fact that the M. C. B. type is the standard of this Association, this will eventually be the only condition they will be obliged to meet.

Let us look at the action of M. C. B. couplers without double buffer blocks: When they come together with the knuckles closed, the points of the knuckles take the shock. When they come together with one or both knuckles open for coupling, the knuckles again take the shock on their points.

Practically all the users of M. C. B. couplers use the buffing horn, or stop, on the back of it. This is, of course, an attempt to have the heavier buffing blows received and absorbed directly on the frame of the car, through the horn, just before the spring is exhausted. The result of our observations on this point is that, as a general rule, the wooden buffer block is not sufficiently protected and sometimes not at all. Light iron plates and light bolts are used, and as a result, the plate is bent or broken, and the wood is abraded by the pounding of the horn, until finally the entire buffing blow is received by the draft gear.

We also find bad design in some of the drawings submitted to us. There is considerable variation in the distance from the horn to the deadwood, and in some cases the compression designed for the draft spring is less than this distance. In these cases all buffing must be taken by the gear. In spite of the evident desire to have the horns, or buffer stop take the heavy blows, the constant increase in the buffing resistance of draft gear indicates a distrust of the device. However, if the design can be improved and we are successful in receiving heavy buffing blows on the end sill, or deadwood, through the horn, we cannot avoid the damage to knuckles and couplers due to their use in coupling and switching in yards and the running up of slack in trains.

There is another item which must also be considered in connection with dependence upon the buffer stop to save the gear. We find that about 13 per cent. of all coupler bodies broken are broken through the neck. This must be attributed in great measure to the wedging action caused by use of the buffer stop. These are the conditions the coupler will be submitted to without the double buffer blocks.

The increase of automatic couplers, and the consequent absence of switchmen between cars, whose presence has hitherto tended to moderate the blows, will induce less caution and greater force in bringing cars together.

Some of the members have serious doubts as to the possibility of relieving the attachments by mean of the buffer stop. If they are correct, the coupler and attachments, without double buffer blocks, have to do all the work, and sustain the consequent damage.

Your Committee has prepared statistics, taken from the records of one of the lines represented on the Committee, showing the number of cars repaired for one

month, and classified the nature of the repairs. The repairs due to drawbars and draft gear present a total of 37½ per cent. of all cars repaired:

Defects.	No. of cars repaired.
Cast iron buffer blocks	11
Deadwoods	95
Deadwood bolts	75
Drawbar stop castings	205
Drawbar stop casting bolts	436
Drawbar stop casting straps	129
Drawbar stop casting strap bolts	221
Drawbar followers	476
Drawbar springs	472
Drawbar pockets (yokes)	51
Drawbar pockets (yokes) bolts	107
Drawbar rests (carrying irons)	51
Drawbar tailbolts	217
Drawbar continuous rods	25
Drawbar tailbolt keys	25
Draft timbers	249
Draft timber bolts	1,008
Drawbars (common)	1,026
Drawbars (M. C. B.)	114
Drawbar knuckles (M. C. B.)	179
Drawbar knuckle pins, etc. (M. C. B.)	39
Total draft gear defects	5,211
All other causes	8,654
Total number of cars repaired during month	13,865

These figures show to what extent expenditures and delays are due to defective draft gear. There is certainly some cause here for *serious consideration* as to the value of double buffer blocks.

We believe that the use of double buffer blocks does not interfere with the practical operation of the M. C. B. coupler. We believe that it would protect the couplers, knuckles and draft gear to a great extent by receiving the heavy buffing blows in the line of greatest resistance and absorbing the force in the framework of the car, which must eventually receive them under all conditions through the inadequacy of a spring to absorb them. The additional cost of double buffer blocks cannot be above $5 per car over the single deadwood. We are inclined to think that this would be much more than counterbalanced by the saving in repairs, switching and delay to freight.

As double buffer blocks are now being used to considerable extent with the M. C. B. coupler, and as there is a further feeling evinced by certain companies to use them; and as your Committee finds the standard now in force of no value since the adoption of the M. C. B. coupler, they would recommend the adoption of the design shown in fig. *G* as the standard for use with the M. C. B. coupler.

Fourth.—This recommendation appears to be very elastic, as is befitting a spring, and the members have so construed it. A majority of members (representing a majority of the Association), replying to our question as to the desirability of increasing the capacity of the draft springs, have answered in the affirmative, and we find that out of the replies members representing but 130,019 cars are using springs of 18,000 lbs. capacity, while members representing 394,362 cars are using draft springs from 19,000 lbs. to 25,000 lbs. capacity.

A majority of the members favor an increase in the capacity of the single draft spring, and for this reason and the mechanical reason that where the same end can be attained by the use of one part it is preferable to the use of two, your Committee would recommend an increase in the capacity of the single spring, which plan would also seem to better meet the requirements of the prevailing draft rigging.

To illustrate and compare the blow-absorbing capacity of the ordinary 18,000-lb. draft spring with the full amount of the blow, we will quote from a report read before the New York Railroad Club, May 19, 1891, by Mr. D. L. Barnes. [Quotation omitted.—EDITOR.]

The foregoing shows very clearly that it is practically impossible to absorb the ordinary buffing blows by means of the draft spring, and that the greater portion must be absorbed by the framework of the car itself. An appreciation of the comparatively light capacity of the 18,000-lb. draft spring, viewed in the above light, is probably what has induced so large a proportion of the members to increase the capacity of their draft spring. In view of this tendency, and also not losing sight of the fact that the draft spring cannot absorb it all, and, on account of the tremendous recoil attendant upon a very great increase in the capacity af the draft spring, we would recommend the substitution of a capacity of 22,000 lbs. in place of the old recommended practice of "not less than 18,000 lbs."

Fifth.—In relation to the fifth standard referred to, your committee has recommended a standard tail end. It finds the use of the standard carrying iron shown, confined to five or six lines, and that it is used not as a carrying iron, but above and at the sides of the neck of the coupler, as a spacing or chafing iron.

Sixth.—On account of the importance of the standard distance, 21¼ in. from the horn to the end of the coupler in carrying out designs for receiving buffing blows, either on the horn, or on double buffer blocks, your committee would urge on the members the necessity of the use of this gauge.

As a matter of information connected with its report, your committee illustrates below the evolution of the more modern types of draw gear. The illustrations are all taken from drawings of standard draft gear, sent us in compliance with request in our circulars of inquiry.

Figs. A^1, A^2, A^3 show the simplest improvements. They consist of an attempt to overcome the spreading tendency of the draft timbers, caused by the buckling of the back follower. The designers have endeavored to accomplish this by means of straps tying the opposite draft bolts together at the bottom, or cross bolts between the two draft timbers with blocks or thimbles to stiffen them. Next in order are those designs, as shown in figs. B^1 B^2, in which the ends of the straps or lugs have been squared up, and solid timber or filling pieces carried from their back ends to the body bolsters. This is an attempt to take the shearing strains from the stop block or stop bolts, and thereby increase the resistance of the attachments to buffing blows. *C* illustrates how this resistance is still further increased by the use of filling blocks bolted to the under side of the centre sills and filling in solid between the ends of the draught timbers, thereby forming a continuous buffing timber and relieving the strains in the draught timbers and draught timber bolts. D^1 D^2 show another method of increasing resistance to buffing strains. In these designs a solid block is bolted between the draft timbers running from the ends of the stops to or through the body bolsters.

A further departure from the M. C. B. recommendation is shown in illustration E^1 E^2, in which the front and back drawbar stops are made in one picce, whereby strains are equally distributed through both.

Illustration *F* shows a design in which it is attempted by inclosing the spring in a case and bolting the two halves of the case securely between the draft timbers by bolts running through all to accomplish what they do in A^1 A^2 A^3 by binders, in B^1 B^2 by increasing buffing resistance, and in E^1 E^2 by uniting the front and back drawbar stops.

G illustrates a design in which it is intended to take a portion of the strain from the draft timbers and body bolster and convey it direct to the centre sills above, by means of stop castings and a filling timber between the centre sills, running from the end sill back beyond the body bolster. The stop castings are framed into this upper timber and into the draft timbers, transverse bolts and tie plates at the bottom of the draft timber binding the whole together.

The foregoing are all illustrations of types of gear extensively used. There are drawings of variations of these before us, but we use these as representing their class. Some of them show the tail bolt for attaching the coupler, bnt all can be used with the yoke, we are informed.

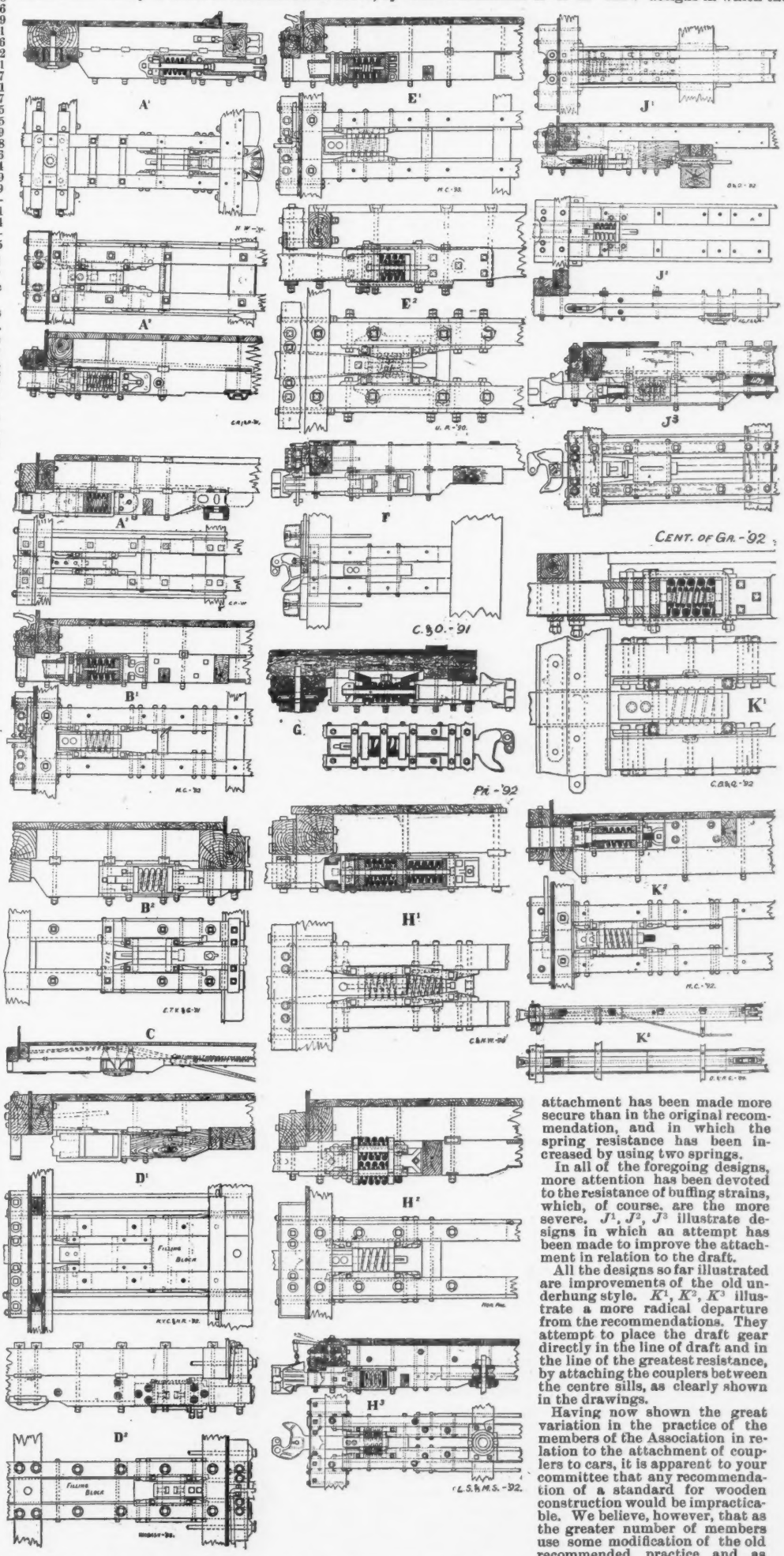
In all of the above types, the designers have attempted an improvement upon the old style single spring type. The illustrations H^1 H^2 H^3 show designs in which the attachment has been made more secure than in the original recommendation, and in which the spring resistance has been increased by using two springs.

In all of the foregoing designs, more attention has been devoted to the resistance of buffing strains, which, of course, are the more severe. J^1, J^2, J^3 illustrate designs in which an attempt has been made to improve the attachment in relation to the draft.

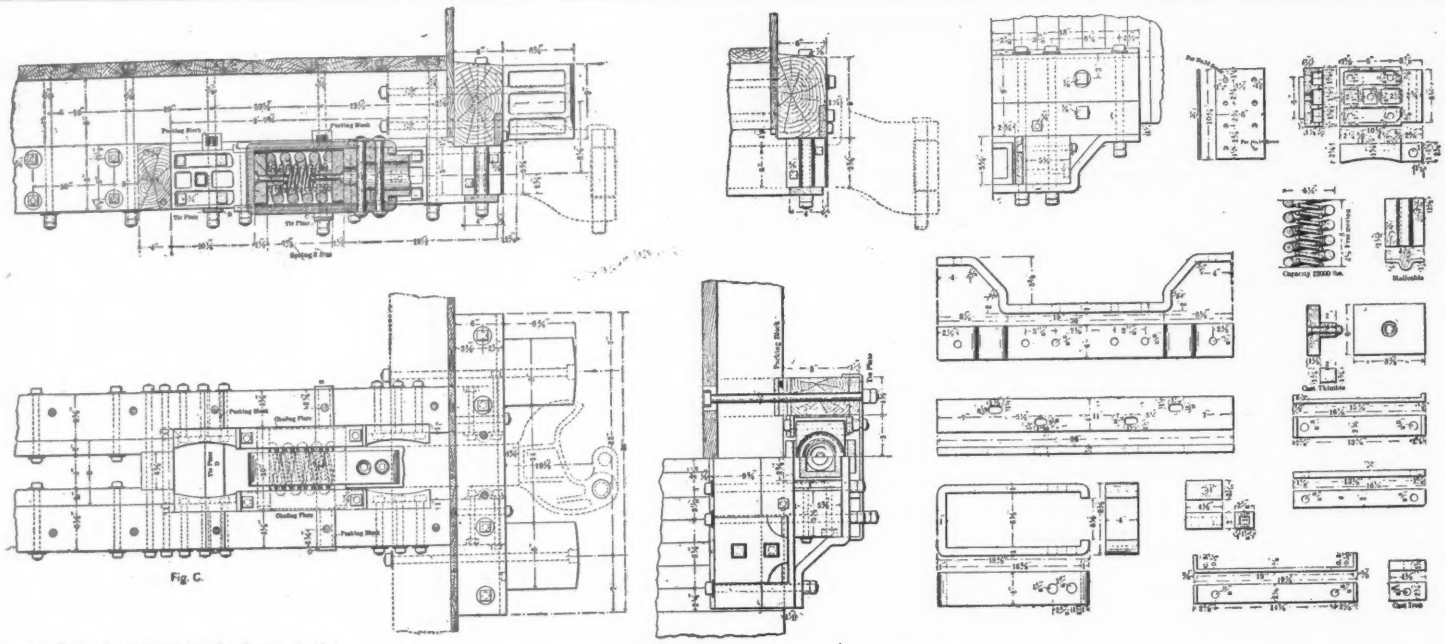
All the designs so far illustrated are improvements of the old underhung style. K^1, K^2, K^3 illustrate a more radical departure from the recommendations. They attempt to place the draft gear directly in the line of draft and in the line of the greatest resistance, by attaching the couplers between the centre sills, as clearly shown in the drawings.

Having now shown the great variation in the practice of the members of the Association in relation to the attachment of couplers to cars, it is apparent to your committee that any recommendation of a standard for wooden construction would be impracticable. We believe, however, that as the greater number of members use some modification of the old recommended practice and as these recommendations are consulted more or less by private car owners and builders, it would be more creditable to the Association to substitute a design of greater strength and more in accord with modern practice. With this in view, we present the design shown in fig. *C* for adoption as recommended practice. (See end of report).

In this design we have attempted to keep somewhat in the line of the old recommendations, but have also



Modern Types of Draw Gear—With Report of M. C. B. Committee on Attachments.



Standards Proposed by the Master Car Builders' Committee on Attachments of Couplers.

attempted to incorporate the best of the unpatented improvements as shown in the various drawings submitted by members. We have increased the resistance of the drawbar stops to buffing blows, by backing them up with timber carried back to or through the bolster. We have increased the resistance of the front drawbar stop to pulling strains by backing it up with solid timber running to the front end of the draft timber. We have tied the draft timbers together by tie plates and bolts to prevent spreading, and have used anchor blocks and bolts in sufficient number and size to secure the draft timbers to the upper structure more securely. The spring, yoke, followers and stop are shown in detail. We have also attempted to strengthen and improve the plate taking buffing blows from the horn of the coupler, as shown.

When metal sills come into use, it might be possible on account of the changes which will ne necessary in the draft gear of most companies to arrive at some standard.

The differences of opinion between the continuous and non-continuous draft gears advocates will disappear by reason of the material, which will render them all practically continuous. The differences between the underhung and the direct designs (figs. K^1 K^2 K^3) will disappear, as it will be possible to have a deep centre channel or beam which will give us direct draft, continuous buffing advantages, relief from the looseness and slack resulting from the underhung separate draft timber, green wood construction, and gain the advantages of K^1 K^2 K^3 while maintaining the regular height of platforms, etc., of the country. We would also be able to use standard height double buffer blocks, which users of K^1 K^2 K^3 would not, and as there are now over a million cars existing at approximately a standard height, this is important.

The complicated, heavy and expensive attachments now in vogue would then be abandoned. as they would be unnecessary, and as the characteristics of the material would forbid us taking the heavy shocks of the buffing blows, metal on metal, through the ends of the couplers and the attachments, we would be compelled to cushion them on wooden end sills or blocks, through the horn of the coupler, or, if that cannot be done successfully, through buffer double blocks.

We believe the time for the substitution of metal sills is approaching, and that now is the time for investigation to begin in regard to the recommendation of a standard draft rigging.

The following is a summary of the recommendations made by your committee in the foregoing report:

1. The adoption of a standard for recommended practice in the method of attaching M. C. B. couplers to cars, and the adoption of standards for (*a*) drawbar yoke, (*b*) drawbar stop, (*c*) follower, (*d*) front carrier iron, as shown in fig. *C*.

2. The adoption of standard buffer blocks and locations for same; also change in dimensions of dead-woods for use with M. C. B. couplers as shown in figs. *G*, H and *I*.

3. The adoption of a standard draft spring, 6¼ in. diameter, 8 in. long, with 22,000 pounds' capacity and 2⅛ free motion.

4. The adoption of a standard form of tail end, as shown by either fig. *A* and fig. *B* or fig. *B* alone.

Committee. { E. D. BRONNER, Chairman; W. H. HARRISON, A. M. WAITT, WILLIAM GARSTANG, A. DOLBEER, J. H. DAVIS.

On motion the committee was discharged and the recommendations will be submitted to letter ballot.

Following the report of this committee and its discussion there was some discussion as to what road should stand the loss of a car destroyed by a cyclone or a storm. Mr. Rhodes and several other gentlemen were of the opinion that the loss should be to the company whose road the car was running on, that the tendency of the rules was to induce railroads to get cars home as soon as possible, and that such a rule would have that tendency. Comparison was made between cyclones and washouts and a legal decision in point was reported, the decision having been that it was an act of Providence and that the owner was responsible. The President thought that Rule 2 covered the case, which states that cars must be returned in as good running condition as when they are received.

The Secretary next made a report on the subject of metal for brakeshoes which he had compiled; the Association voted to receive and file the report. This brought out some discussion by a number of members as to the expense attending experiments necessary to determine t be best metal for brakeshoes which ended in a motion being made and carried that a committee be appointed to report at the last session of this convention as to the advisability of making extended brakeshoe tests.

Several committee reports follow.

STEEL CENTRE SILLS FOR FREIGHT CARS.

The experience in this country with metal centre sills and metal under-frames is quite limited, and it is impossible to gather from it much that is definite or conclusive. The experience here has been confined to the following: Metal under-frames for locomotive tenders. Several metal under-frames on the New York Central and the Lake Shore & Michigan Southern roads. Sixty cars of the first type built by the Harvey Steel Car Co., used principally on the Chicago, Milwaukee & St. Paul Railroad. Several tank, box and gondola cars recently built by the Harvey Steel Car Co., on an improved plan, from designs of Mr. J. D. McIlwain. Various special cars for unusual freight, built by several railroads, principally the Pennsylvania.

The Michigan Central Railroad has made an investigation of the subject, and has proposed a metal underframe from designs of Mr. Robert Miller, General Superintendent; Mr. E. D. Bronner, Superintendent Car Department; and Mr. Robert P. Lamont, Mechanical Engineer. Several designs have been made by the Fox Solid Pressed Steel Company, of Joliet, for cars for the Illinois Steel Company.

A considerable number of cars have been built with iron pipe under-frames, but these are scarcely practicable and are not of a type that would ever be generally used, and therefore have been omitted from this report.

Nothing has resulted from the experience of those who have been using the above mentioned cars that leads to a strong conviction for or against the use of steel centre sills. It has, however, been found on the Lake Shore road, that running repairs are much less with the steel under-frames. Steel tender-frames have been annoying in repairs, not on account of the total cost, but because when the tender is disabled the locomotive to which it belongs has to be taken from service. But few tenders are kept for extras, and owing to the delays incident to repairing steel tender-frames they are not considered favorably by the majority of railroad men; but as steel frames for tenders are stronger than wooden ones, and by their increased strength and durability have reduced repairs, there are some who believe them to be more desirable than wooden frames. One marked advantage has been found in the freedom from decay. It is practically impossible to make a steel tender-frame that will not be distorted more or less in such collisions and wrecks as break up and damage wooden ones. Hence, a logical conclusion is that the delay in repairing steel under-frames makes them less practicable than wooden frames for locomotive tenders under the present method of operating locomotives. With freight cars, of course, the case is different, as the delay in repairing freight cars does not extend to locomotive equipment.

What precedes is practically the entire result of experience in this country with steel centre sills and underframes.

In England, where wooden under-frames are very much heavier in proportion to the carrying capacity of the cars than is common practice here, steel under-frames are gradually being introduced, both for freight and passenger cars. The reports of service are very decidedly in favor of metal under-frames.

In Germany, Belgium, Sweden, Norway, Russia, France, India and on some roads in Mexico, and in nearly all foreign countries, the metal under-frame is regular standard practice. Perhaps no argument is necessary to show that, in countries like Germany and France, where the cost of repairs to cars has been reduced to a point below the cost in other countries, the maintenance of a metal under-frame costs less, under the conditions of operation there existing, than the maintenance of wooden frames. Frequent reports by the government railroad officers of France and Germany prove beyond doubt that metal under-frames, for both passenger and freight cars, are more economical and better adapted for service in those countries than wooden ones, and further discussion of this point has been omitted, believing that the statement would be accepted without more evidence, and this report has been more particularly confined to descriptions of typical designs of metal frames used in various countries.

The advantages that may be expected from the use of metal centre sills lie almost solely in the increased durability and the reduced cost of inspection. A metal centre sill, when it is properly made, is the equivalent of a continuous drawbar arrangement from end to end of the car; and being composed of material having a high tensile strength, steel centre sills can be readily made so secure as to require but little inspection. The centre sills of a car and the draft rigging attachment are the parts of the car body which require the most attention from car inspectors, and cost more to maintain than other parts of the car body; therefore, it might be expected that the introduction of steel centre sills would reduce the cost of running repairs.

In case of wrecks, it is a question whether the steel centre sills would not be more expensive to repair than wooden ones, but the total cost of repairs to centre sills and draft riggings caused by the class of wrecks which would seriously damage a steel centre sill is not very large; and although the use of a steel centre sill might increase materially the cost of repairing centre sills after bad wrecks, yet, owing to the fact that on a well appointed road bad wrecks are not numerous, the result would not be an increase in the total cost of all repairs; in fact, the greater durability of a suitable steel centre sill ought to so reduce running repairs as to give a decrease in the total cost of all repairs to car bodies. It is, of course, true that wooden sills frequently last for 15 years where the cars receive reasonably good service; but the present tendency is to use a sub-sill the entire length of the car to prevent damage to top and draft sills. With the present heavy equipment the result of this is that the total weight and cost of a car is greater with the present construction of wood than it would be with steel centre sills at the prices at which steel is now offered. In any considerable quantity steel sills can be purchased for less than two cents per pound.

An examination of existing designs and a review of the experience of those who have been in direct contact with the repairing of steel under-frames, indicate that the following are some of the essential features of metal under-frame construction.

First.—All joints should have sufficient area and rivets and bolts sufficient in size and number to prevent movement of the parts one upon the other when the cars are in service.

Second.—All joints should be so designed as to permit repairs to be made with the least possible delay and manipulation, and if possible without heating.

Third.—As far as possible the centre sills should be continuous from end to end of the car.

Committee { D. L. BARNES, J. N. BARR, J. D. MCILWAIN.

CAST-IRON WHEELS.

The committee appointed on cast-iron wheels, to investigate and report whether there is any substantial difference in wheels made by different methods, such as by solid chills or contracting chills, or by any other difference in process of manufacture, sent out a circular of inquiry, containing nine specific questions.

There were 25 replies in response to this circular, 15 of which were from the heads of motive power departments of as many different railroads, and 10 from wheel manufacturing companies.

From reliable data furnished by railroad companies and manufacturing companies which have kept accurate records, there appears to be a decided advantage in wheels made by the use of contracting chills. One of the largest roads in the country, which has been making wheels from the same iron at the same time in both chills, and which was in no way interested in any patents on contracting chills, says that out of a total of 6,204 wheels, or 3.10% in each kind of chill, there was a percentage of loss of 5.35 per cent. in the solid chill as against 0.61 per cent. in the contracting chill. Another large manufacturer makes an almost similar report, and two of our most prominent Master Car Builders are very emphatic in their statements of decided advantages in the uniformity of chill, true diameter and freedom from soft places by using the contracting chill.

Committee { GEO. W. WEST, Chairman, W. H. THOMAS, JOHN PLAYER.

PROTECTION OF TRAINMEN AND LETTERING FAST FREIGHT LINE CARS.

When the present committee began its investigation it found both subjects had been canvassed so thoroughly by previous committees that little room was left for improvement in the reports already submitted to the Association for consideration.

Protection of Trainmen from Accidents.

The committee would respectfully recommend for adoption certain additions, as noted below, to the present standards for protection of trainmen from accidents, without any further change:

First—Under Running Boards. This paragraph to be made to read as follows, in which the changes are indicated by italics:

"The ends of the running boards of box cars to be made to project over the ends of the car, so that the minimum distance between the ends of those on adjoining cars will not be over 12 in.; *and that the running boards be made in four sections, each board 1 in. thick by 5½ wide, dressed, 1 in. space between each board, total width of running board to be 25 in., with suitable number of cleats.* The projecting ends to be supported on two brackets, at each end of the car, made of ⅝ by 1¼ in. iron, with a hardwood cleat 3 by 1 in. on upper ends, fastened with ½-in. bolt and nut in each bracket. The lower end of each bracket to be fastened to the end of the car with two ½-in. bolts and nuts."

Second—Under Steps. The second paragraph to be made to read as follows, in which the changes are indicated by italics:

"A hand-hold to be attached to the side of the car above each step—to be placed horizontally 2 ft. above the bottom of the sills *wherever possible, and to be located lower down wherever the design of car will not admit of the above location being accurately adhered to.* The hand-hold to be made of ⅝-in. round iron, 2 ft. long in the clear between the ends; to have 2½ in. clear space between it and the sides of the car; to be fastened with one ½-in. lag screw in each end, screwed not less than 2 in. into the framing. Another handle of the same size, and fastened in the same way, to be attached horizontally to the end of the car the same distance above the sills and on the opposite side of the ladder."

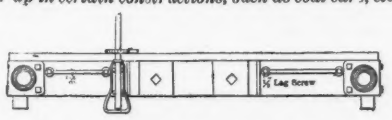
Third.—Under Ladder and Handles. The whole matter to read as follows, in which the recommendations now shown in the standards for ladder and handles are incorporated as standards, and in which an additional paragraph is made as printed in italics with figure illustrating same:

"LADDER AND HANDLES.

"That each box and stock car have two ladders, not less than five steps in each ladder, made of ⅝-in. round iron, projecting 3½ in. from the sidings, securely fastened to each end at diagonal corners, with a handle directly over the ladders on the roof, and that the lower step of the ladders have a guard or projection in order to prevent men slipping when swinging around the end of the car to get on the step.

"When ladders are on the end of the car, a handle should be placed horizontally about 24 in. above the lower edge of sill on side of car above the steps, to enable trainmen to get a firm hold before or while using the steps; also when the ladder is on end of car a handle should be placed on opposite corner from the ladder, and when ladders are on the side of car, two such handles should be placed on each end of the car, about 24 in. above the bottom of the sill.

"On all freight cars, such as flat cars, etc., not supplied with ladders, two ( ) handles are to be placed at each end of car, as shown in fig. 1, unless it be decided preferable to locate them higher up in certain constructions, such as coal cars, etc."



System of Lettering and Numbering Fast Freight Line Cars.

Under this head your committee would recommend that the standards as they now stand should remain unaltered with one exception, namely, that paragraph No. 2, reading "doors should have no marks whatever," be stricken out, and that a new paragraph be inserted here, reading as follows:

"Side doors to bear the initials of the road to which the car belongs, or the name of the line in which the car is used, together with the number of the car."

Committee { E. P. LORD, Chairman, SAMUEL IRVIN, THOMAS SUTHERLAND,

STEEL-TIRED WHEELS.

Your committee having found it impossible, last year, to obtain sufficiently full and positive information, in reply to its circulars of inquiry, to form accurate comparative statements as to the performance of the various types of steel-tired wheel centres in use in the country, has, this year, confined itself to asking for information of a more general character.

The information contained in the replies received has been tabulated and is shown in the following three statements, the first of which shows the expression of preference of the members of the Association for the various types of centres; the second, their expression of opinion as to whether spoke wheels are objectionable for use under passenger equipment cars; and the third, the approximate weight and price of the various types of steel-tired wheels now in the market. The figures given in the latter statement are all for 33-in. wheels with tires 2½ in. thick, except in the case of the "Thurber" wheel, manufactured by the Brooks Locomotive Works, which is quoted with 2¼-in. tire.

TABLE 1.—PREFERENCES AS TO CENTRES.

Type of centre.	Preferred by: Number of members.	Preferred by: Passenger cars represented.	Remarks.
Bolted	10	1,616	
Solid Wrought	13	6,036	Spoke centres preferred by two members representing 578 cars. Disc centres preferred by seven members representing 1,610 cars. No preference expressed by four members representing 3,818 cars.
Solid Cast	5	1,056	All prefer the plate centres.
No preference expressed	7	1,964	
Total replies	35	10,672	

TABLE 2.—SPOKE WHEELS; OBJECTIONS.

	Raising Dust.	Noise.	Hard to clean.	Rim springing.	Various reasons.	Total objections.	No objections.	No opinion expressed.	Total replies.
Number of members	11	1	2	1	1	16	12	7	35
Passenger cars represented	1,689	73	600	332	485	3,179	2,300	5,193	10,672

TABLE 3.—WEIGHTS AND PRICES OF WHEELS.

Manufacturers or agents.	Designation of wheel.	Weight.	Price.
Bolted Centres:			
Allen Paper Car Wheel Co.	Paper Centre No. 1	775	$52.00
Brooks Locomotive Works	Thurber	796	57.50
Cast Centres—Plate:			
Allen Paper Car Wheel Co.	C. I. Dbl. Plate Spoke, No. 9	775	47.00
Allen Paper Car Wheel Co.	C. I. Dbl. Plate Spoke, No. 11	775	50.00
Allen Paper Car Wheel Co.	Cloud Boltless	775	47.00
A. Whitney & Son		850 to 900	45.00
Ramapo Wheel & Foundry Co.	Snow Boltless	912	48.00
McKee, Fuller & Co.			
Taylor Iron & Steel Co.		785	37.00
Cast Centres—Spoke:			
Allen Paper Car Wheel Co.	C. I. Spoke No. 7	775	47.00
Allen Paper Car Wheel Co.	Cloud Boltless	775	47.00
A. Whitney & Son		850 to 900	45.00
Ramapo Wheel & Foundry Co.	Cast Spoke	912	48 00
McKee, Fuller & Co.			
Taylor Iron & Steel Co.		785	37.00
Wrought Centres—Disc:			
Page, Newell & Co.	Brunswick	670	48.00
Thos. Prosser & Son.	Krupp No. 1	800	57.00
Boles Steel Wheel Co.	Boles, W. I., Centre No. 2	800	48.00
Chas. G. Eckstein & Co.	Arbel	675 to 725	44.00 to 46.00
Wrought Centres—Spoke:			
Page, Newell & Co.	Brunswick	670	48.00
Chas. G. Eckstein & Co.	Arbel	675 to 725	44.00 to 46.00
Standard Steel Works	Vauclain	680 to 700	45.00
Philip S. Justice & Co.	Owen & Dyson	725	45.00
Steel Truss Car Wheel Co.	Steel Truss Wheel	760	50.00

Committee { R. E. MARSHALL, J. O. PATTEE, C. H. CORY.

HEIGHT OF DRAWBARS AND STANDARD IRON BRAKE-BEAM.

The Committee on Standards, in their report made to the Convention of 1892, say, in regard to the height of drawbars:

"The indications are that the standard height of 33 in. for freight equipment cars has not been adhered to, and there is a tendency to increase this height. It would therefore seem well to have the facts reviewed by a special committee, who should advise whether it is expedient to modify the standard height of drawbars for freight equipment cars."

Your Committee has made inquiry through a circular issued to all members of the Association; the replies represent 519,897 cars.

In the following statement your Committee has shown the effect of adopting at this time a height for drawbars of 33 in., 34 in., 34½ in., 35 in., 35½ in. or 36 in. compiled from information which has been received:

Percentage of cars that can be made	33	inches	36.73
"	34	"	53.96
"	34½	"	52.00
"	35	"	79.55
"	35½	"	52.90
"	36	"	52 04

It should be noted that the number of cars reported is *somewhat less than half* of the total number represented in the Association, and therefore your Committee feels some hesitation in drawing conclusions from the figures shown; but they can probably be taken as fairly representing the present situation.

It is evident from the summary that there would be less hardships imposed upon railroad companies in going above the present standard than in maintaining it, and therefore your Committee thinks it is expedient to increase the present standard of 33 in.

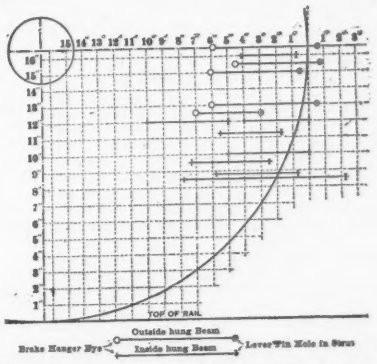
Iron Brakebeam.—The Committee on Standards, in reporting to the Convention of 1892, says:

"Plate 12 now shows the Westinghouse iron brakebeam. It is suggested that the drawing should be revised to simply show the centre lines of a triangular brakebeam, without showing any specific construction of brakebeam, but distinctly showing the Christie head and shoe in position, the distance from centre to centre of brakeheads, the location of brakebeam strut, the angle of the brakebeam lever which passes through the strut," etc., etc.

The standard drawing of the Christie head and shoe shows a head arranged for wooden brakebeam, and therefore, in order to carry out its instructions, your Committee should show the Christie head for an iron beam. Unless a particular construction of brakebeam be shown, this cannot well be done, and the instructions of your Committee do not permit it to recommend any specific form of beam. Furthermore, the design of the brakehead, the location of the strut, the lever pin hole in strut and the brakehanger eye depend upon three things: First, the kind of iron beam used. Second, the point at which the beam is hung, with relation to the distance from the rail. Third, the position of the strut, whether horizontal and parallel with the rail or inclined to it.

The information which the Committee has received shows that for different roads the height of centre of beam from rail for 33-in. wheels varies from 8½ in. to 16½ in., and, unless this distance can be made uniform, there seems little prospect of adopting a beam with fixed heads which will in any degree be interchangeable.

The following diagram will illustrate the difficulties concerning the different points at which beams are now hung, and the varying locations of the lever pin holes in strut, and the location of the brakehanger eye or support.



This shows one-quarter of a 33-in. wheel, divided horizontally and vertically by dotted lines 1 in. apart, for convenient reference as to locations. The heavy horizontal lines, with circles at the ends, represent location of struts for outside-hung beams and the heavy horizontal lines, with crosses at the ends, represent location of struts for inside-hung beams. Looking at the diagram, the left-hand end of strut is the location of brakehanger eye or support, and the right-hand end of the strut shows location of the brake lever pin hole. It will be seen that the lowest strut (which is located in a horizontal line through centre of brakebeam) is 8¼ in. from the rail, and the highest beam as shown by the strut is 16½ in. from the rail. The extreme position for the lever pin hole for outside-hung beams is seen to vary from ¾ of an inch outside of the wheel to 3 in. inside, measured from the vertical line touching the tread of wheel. The extreme position for lever pin hole for inside-hung brake beams is seen to vary from 0 to 2¼ in. outside of wheel, and from ¾ of an inch to 5 in. inside of wheel, starting from the vertical line above referred to.

In the same way it will be noted that the brake hanger eye varies in its location as much as do the locations of the lever pin hole.

If a standard height for center of beam from rail could be adopted, your committee feels that a beam could be designed, and it would be possible to adopt a standard location for holes for brake lever and a location for brake hanger eye. If this is done it will be necessary to decide on a location for center of beam for outside-hung brakes, and for inside-hung brake beams.

Your committee, therefore, thinks it is justified in saying that the instructions received cannot be carried out; and it is hoped that the difficulties in the way have been made entirely clear.

Committee { E. D. NELSON, Chairman, JOHN BEAN, JOHN H. RANKIN, C. A. SCHROYER.

AXLES, JOURNAL BOXES, LIDS AND WEDGES.

Your Committee on Axles, Journal Boxes, Lids and Wedges have been instructed "to consider the suggestions of the Committee on Standards and to recommend in detail, with drawings, how these standards should be modified and published."

The recommendations of the Committee on Standards as reported at the Convention of 1892, as regards Axles, Journal Boxes, Lids and Wedges, are as follows:

"AXLE.—The committee is of the opinion that it would be expedient to submit to a special committee, appointed for the purpose, the question of modifying the present light axle so as to make its journal 4 × 7 in. instead of 3¾ × 7 in. as now.

"JOURNAL BOX.—It is suggested that the drawings of the present standard journal box, if reproduced full size, should be very carefully revised, as there are evidences that the present drawings are not complete in every respect.

"JOURNAL BOX LIDS.—The drawings should be revised together with the drawings of the journal box.

"JOURNAL BEARINGS AND WEDGES.—The designs for these parts also need to be carefully redimensioned."

Your present committee advises in reference to these several details as follows:

Axles.—The Committee on Standards called attention to the fact that a considerable number of roads had increased the diameter of the journal of the light axle from 3¾ in. to 4 in., thus making the journal 4×7 in. instead of 3¾×7 in., which latter dimensions are standard. Our committee does not feel justified, however, in advising the abandonment of the present standard and the adoption of a new standard, our principal reason being that it is evident that nearly all new freight equipment cars recently built have been mounted on the large axle, having journals 4¼×8 in., and it will be a question of only a few years when the light axle with journa 3¾×7 in. will become out of date and practically obsolete. We believe that at that time it can, with advantage, be officially declared as obsolete, but doubt whether there would be any advantage in taking any action whatever in reference to the light axle at the present time.

Journal Boxes, Journal Box Lids, Journal Bearings and Wedges.—It is conceded that the designs for these parts as illustrated by the lithographed sheets which are issued annually by the Association in connection with its Report of Proceedings, are very defective; not being completely dimensioned, and the dimensions which are given on the different views not always checking accurately one with another. It is well known that different railway companies and carbuilders make journal boxes which are supposed to be, and are, called Master Car Builders' standard, but which, as a matter of fact, differ one from another in many minor details; we believe that this condition of things may fairly be attributed to the fact that the official drawings of the Association are imperfect. Therefore, we advise that these drawings should be republished in six different sheets: one set of three sheets to show the journal box and parts, for axle with journal 3¾ × 7 in.; the other set of three sheets to show the journal box and parts, for axle with journal 4¼ × 8 in. Each set of three sheets to comprise: First, a full-sized drawing (in three views) of the journal box, with all its contained parts (such as axle, journal bearing, wedge, lid, etc.) in their proper relative position, as in service. Second. a full-sized drawing (in three views) of the journal box by itself, without any of its contained parts. (This drawing being intended for use in making journal box patterns.) Third, a full-sized drawing (in several views) showing separately the journal bearings, wedge, lid and lid hinge bolt.

The Committee submits herewith a set of such blueprints from drawings which have been prepared for the purpose, but calls attention to the fact that the prints illustrate only journal boxes adapted for use in diamond trucks. If the Association thinks it necessary, similar drawings can readily be prepared showing a modification of these designs as required for a journal box for use in connection with a truck of the pedestal type. The Committee also calls attention to the fact that in preparing these designs which are now submitted, it was necessary to show some definite form of journal box lid, although the standard of the Association simply provides that the lid shall be hinged at the top and shall be of certain general dimensions, but does not specify the particulars of material or construction. Furthemore, the published illustrations of the present standard journal boxes and lids do not include any details of the lid hinge bolts. Therefore, we have taken the liberty of introducing, in the proposed revised designs, details of these bolts.

Your Committee concurs in the recommendations of of the Committee on Standards that all drawings issued under the auspices of the Association as illustrating its standards shall be uniform in size and shall be made on strong transparent paper, so that blueprints can be taken from them direct. Also, that lithographed sheets of reduced size should be bound into the Annual Proceedings, as now.

Committee { R. H. SOULE. W. H. DAY, W. H. LEWIS.

NOTE.—Prints referred to were not received in time to be included in this report, but will be presented when report is read at Convention.

EXHIBITS.

This pleasant and important feature of previous conventions has been neglected this year by supply men and dealers in railroad equipment. This probably can be explained by the fact that exhibitors of previous years have spent their energies at the World's Fair. The patriotic firms who have this year brought exhibits to the convention are the following:

C. B. Hutchins & Sons, Detroit, Mich., models of freight car roof and the Herbert & Hutchins grain door.

The Standard Railroad Equipment Co., New York, the Adams M. C. B. oil box, the Alexander brake stock adjuster, and a full sized drawbar of the Brown's M. C. B. emergency link car coupler.

The Peerless Rubber Co., New York, a large line of specialties, air brake hose, rubber packings, gaskets, Rainbow packing, etc.

H. W. Johns Manufacturing Co., New York, samples of asbestos materials, liquid paints and roofings.

The Iowa Coupler Co., Des Moines, a full sized M. C. B drawbar.

The Keystone Manufacturing Co., Buffalo, showed samples of Nonpariel Ratchet wrenches.

B. E. Tilden & Co., Chicago, exhibit full sized car and loco motive replacing frogs.

American Decoration Co., Boston, Mass., samples of "Lignomur" for passenger car head linings.

Chicago Grain Door Co., Chicago, Ill., a model of rabbetted grain door.

L. C. Chase & Co., Boston, exhibit a large line of car plushes and velours.

Davis Car Shade Co., Portland, a full sized model of automatic car curtains, signal flags, etc.

O. M. Edwards, Syracuse, N. Y., a model of the Edwards car window.

M. C. Hammett, Troy, N. Y., exhibit a model of standard crank-pin gauge, also model of Tornado car ventilator.

Northwestern Equipment Co., Chicago, Ill., exhibit model of the Hubbard anti-friction side bearings.

Hartford Woven Wire Mattress Co., Hartford, Conn., exhibit samples of car seats, floor mats, etc.

Crosby Steam Gauge and Valve Co., Boston, bromide prints of steam gauges, chime, whistles, Johnstone blow-off cocks, steam engine indicators, muffled and plain pop safety valves and improved gauge testing apparatus.

Isaac G. Johnson & Co., New York, showed models for complete equipment of platform, buffer and coupler for passenger cars, freight and locomotive couplers.

Geo. W. Stadler, Mansfield, O., model of M. C. B. coupler.

Morton Safety Heating Co., Baltimore, Md., model of their well known heating system.

The Ensign Manufacturing Co., Huntington, W. Va., a model of the Russell snow plow.

Wakefield Rattan Co., Boston, a large line of photographs of the Henry car seat.

Taylor Iron & Steel Co., High Bridge, N. J., samples of Manganese steel car wheels made of Hadfield's patent high Manganese steel; also a steel tired car wheel with cast iron centres and welded in.

Evans Artificial Leather Co., Boston, samples of artificial leathers for car seats, curtain trimmings, etc.

The Hinckley Brake Co., Trenton, N. J., exhibit a complete working model of automatic slack adjusters for taking up slack in brake rigging.

Brooks Locomotives at the World's Fair.

The Brooks Locomotive Works, of Dunkirk, N. Y., have issued a handsome catalogue of the nine engines exhibited by the company at the World's Columbian Exposition, each engine being the subject of a full page direct-process illustration. The company has also

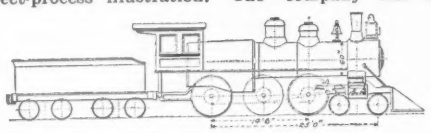


Fig. 1—Passenger Engine, Great Northern Railway.

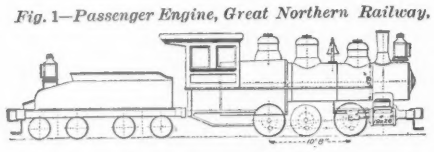


Fig. 2—Switching Engine, Great Northern Railway.

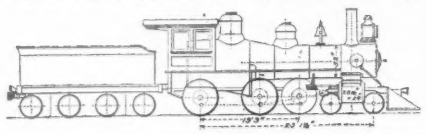


Fig. 3—Two-Cylinder Compound Freight Engine, Lake Shore & Michigan Southern Railway.

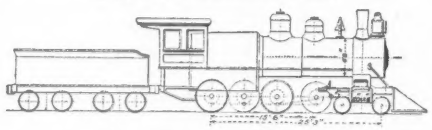


Fig. 4—Freight Engine, Great Northern Railway.

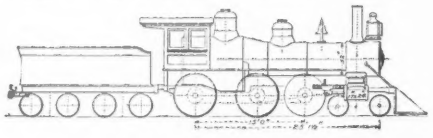


Fig. 5—Passenger Engine, Lake Shore & Michigan Southern Railway.

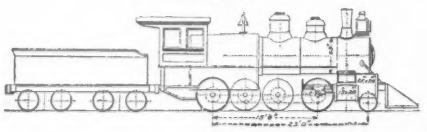


Fig. 6—Four-Cylinder Compound Consolidation Freight Engine, Great Northern Railway.

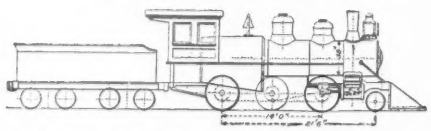


Fig. 7—Freight Engine, Great Northern Railway.

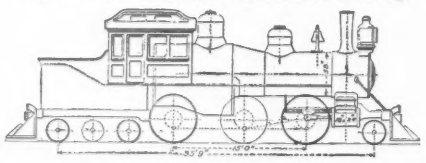


Fig. 8—Suburban Engine, Chicago & Northern Pacific Railroad.

printed for distribution. on loose sheets, copies of the specifications for each engine, each illustrated with an outline drawing. These specifications are in handy pocket form, very convenient for visitors to the fair. We reproduce herewith eight of the drawings of these engines. The principal dimensions are shown below:

Engine No. 650, fig. 1.

Cylinders, diameter and stroke	19 × 26 in.
Driving wheels, diameter	72 in.
Working pressure, per square inch	180 lbs.
Boiler, type and diameter	Belpaire; 60 in.
Firebox, length	114 in.
" width	32 in.
Tubes, number	202
" diameter	2¼ in.
" length	13 ft. 10 in.
Wheel base, driving	14 ft. 6 in.
" " engine	25 ft. 0 in.
" " engine and tender	52 ft. 3¾ in.
Weight on drivers	111,000 lbs.
" on truck	27,000 lbs.
" total	138,000 lbs.
" tender	75,000 lbs.
Capacity of tender, coal	8 tons
" " tank	4,000 gal.

Engine No. 258, fig. 2.

Cylinders, diameter and stroke	19 × 26 in.
Driving wheels, diameter	49 in.
Working pressure	180 lbs.
Boiler, type and diameter	Belpaire; 58 in.
Firebox, length	98 in.
" width	32 in.
Tubes, number	180
" diameter	2¼ in.
" length	11 ft. 1 in.
Wheel base, driving	10 ft. 8 in.
" " engine	10 ft. 8 in.
" " engine and tender	40 ft. 7¾ in.
Weight on drivers	114,700 lbs.
" total	114,700 lbs.
" tender	67,000 lbs.
Capacity of tender, coal	5 tons
" " tank	3,100 gals.

Engine No. 661, fig. 3.

Cylinders, diameter and stroke	18 and 28½ × 24 in.
Driving wheels, diameter	56 in.
Working pressure	180 lbs.
Boiler, type and diameter	Wagon top; 52 in.
Firebox, length	96 in.
" width	34½ in.
Tubes, number	186
" diameter	2 in.
" length	12 ft.
Wheel base, driving	13 ft. 3 in.
" " engine	23 ft. 1½ in.
" " engine and tender	45 ft. 6¼ in.
Weight on drivers	76,500 lbs.
" " truck	25,500 lbs.
" total	102,000 lbs.
" tender	71,500 lbs.
Capacity of tender, coal	6 tons
" tank	3,700 gals.

Engine No. 410. fig. 4.

Cylinders, diameter and stroke	20 × 26 in,
Driving wheels, diameter	55 in.
Working pressure	180 lbs.
Boiler, type and diameter	Belpaire; 68 in.
Firebox, length	114 in.
" width	32 in.
Tubes, number	250
" diameter	2¼ in.
" length	13 ft. 10 in.
Wheel base, driving	15 ft. 6 in.
" engine	25 ft. 3 in.
" engine and tender	52 ft.
Weight on drivers	136,000 lbs.
" truck	20,000 lbs.
" total	156,000 lbs.
" tender	82,000 lbs.
Capacity of tender, coal	8 tons
" tank	4,000 galls.

Engine No. 600, fig. 5.

Cylinders, diameter and stroke	17 × 24 in.
Driving wheels, diameter	68 in.
Working pressure	180 lbs.
Boiler, type and diameter	Wagon top; 52 in.
Firebox, length	96 in.
" width	42 in.
Tubes, number	202
" diameter	2 in.
" length	13 ft. 10⅛ in.
Wheel base, driving	15 ft.
" " engine	25 ft. 1½ in.
" " engine and tender	47 ft. 7¼ in.
Weight on drivers	88,500 lbs.
" " truck	25,000 lbs.
" total	113 500 lbs.
" tender	71,500 lbs.
Capacity of tender, coal	6 tons
" " tank	3,700 gals.

Engine No. 515, fig. 6.

Cylinders, diameter and stroke	13 and 22 × 26 in.
Driving wheels, diameter	55 in.
Working pressure	180 lbs.
Boiler, type and diameter	Belpaire; 63 in.
Firebox, length	114 in.
" width	32 in.
Tubes, number	208
" diameter	2¼ in.
" length	11 ft. 7 in.
Wheel base, driving	15 ft. 6 in.
" " engine	23 ft.
" " engine and tender	50 ft.
Weight on drivers	130,000 lbs.
" " truck	17,000 lbs.
" total	147,000 lbs.
" tender	75,000 lbs.
Capacity of tender, coal	8 tons
" " tank	4,000 gals.

Engine No. 351, fig. 7.

Cylinders, diameter and stroke	19 × 24 in.
Driving wheels, diameter	55 in.
Working pressure	180 lbs.
Boiler, type and diameter	Belpaire; 58 in.
Firebox, length	98 in.
" width	32 in.
Tubes, number	212
" diameter	2 in.
" length	11 ft. 1 in.
Wheel base, driving	14 ft.
" " engine	21 ft. 6 in.
" " engine and tender	49 ft.
Weight on drivers	102,000 lbs.
" " truck	16,000 lbs.
" total	118,000 lbs.
" tender	75,000 lbs.
Capacity of tender, coal	8 tons
" " tank	4,000 gals.

Engine No. 24, fig. 8.

Cylinders, diameter and stroke	18 × 24 in.
Driving wheels, diameter	63 in.
Working pressure	180 lbs.
Boiler, type and diameter	Wagon top; 58 in.
Firebox, length	102 in.
" width	32 in.
Tubes, number	250
" diameter	2 in.
" length	11 ft. 1 in.
Wheel base, driving	15 ft.
" " engine	35 ft. 9 in.
" " engine and tender	35 ft. 9 in.
Weight on drivers	102,000 lbs.
" " two-wheel truck	16,000 lbs.
" " six-wheel truck	48.000 lbs.
" total	166,000 lbs.
Capacity of tender, coal	4½ tons
" " tank	2,600 gals.

Baldwin and Schenectady Locomotives at the World's Fair.

We show on an inset with this issue of the *Railroad Gazette* an elaborate table giving full descriptions of the 15 engines sent to the World's Fair by the Baldwin Locomotive Works, of Philadelphia, and of the four sent by the Schenectady Locomotive Works, of Schenectady, N. Y. The table is accompanied by small cuts, reproduced from photographs, by which the principal characteristics of the engines can be seen at a glance and much better than they could be learned from a tabular comparison.

The more important dimensions of the engines are shown under each cut and the rest of the data is in the table. The lengths of the wheel bases of the tenders and of the tender trucks are shown on the cuts.

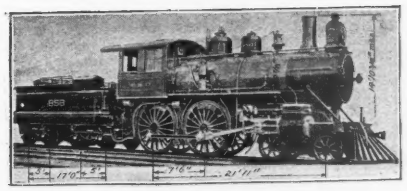


Fig. 1—*Engine* 858.

Cylinders	20 x 24 in.
Weight on drivers	75,200 lbs.
Weight on truck wheels	41,150 lbs.
Weight, total	116,350 lbs.
Wheel base, engine	21 ft 11 in.
Wheel base, driving	7 ft. 6 in.
Boiler, diam	60¾ in
Height of stack	14 ft. 10¾ in.
Heating surface, firebox	149.00 sq. ft.
Heating surface, tubes	1,544.00 sq. ft.
Heating surface, total	1,693.0 sq. ft.
Grate surface	24 75 sq. ft.
Driving wheels, diam	78 in.
Engine truck wheels, diam	36 in.
Tender truck wheels, diam.	36 in.

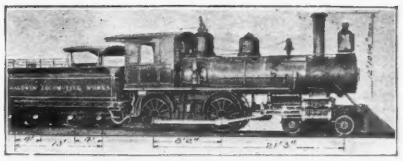


Fig. 6—*Engine* 13,351.

Cylinders	19 and 15 x 20 in.
Weight on drivers	37,020 lbs.
Weight on truck wheels	21,300 lbs.
Weight, total	58,320 lbs.
Wheel base, engine	21 ft. 3 in.
Wheel base, driving	8 ft. 2 in.
Boiler, diam	45⅛ in.
Height of stack	12 ft. 10¼ in.
Heating surface, firebox	73.00 sq. ft.
Heating surface, tubes	788.00 sq. ft.
Heating surface, total	861.00 sq. ft.
Grate surface	10.00 sq. ft.
Driving wheels, diam	49¼ in.
Engine truck wheels, diam	25 in.
Tender truck wheels, diam	30 in.

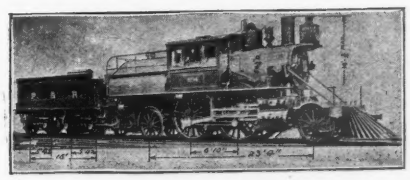


Fig. 2—*Engine* 694.

Cylinders	13 and 22 x 24 in.
Weight on drivers	82,700 lbs.
Weight on truck wheels	47,000 lbs.
Weight, total	129,700 lbs.
Wheel base, engine	23 ft. 4 in.
Wheel base, driving	6 ft. 10 in.
Boiler, diam	56¾ in.
Height of stack	14 ft. 0¾ in.
Heating surface, firebox	173.00 sq. ft.
Heating surface, tubes	1,262.00 sq. ft.
Heating surface, total	1,435.00 sq. ft.
Grate surface	76 sq. ft.
Driving wheels, diam	78 in.
Engine truck wheels, diam	48 in.
Tender truck wheels, diam	36 in.

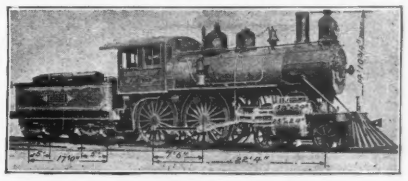


Fig. 7—*Engine* 859.

Cylinders	13¼ and 23 x 24 in.
Weight on drivers	78,480 lbs.
Weight on truck wheels	44,300 lbs.
Weight, total	122,780 lbs.
Wheel base, engine	22 ft. 4 in.
Wheel base, driving	7 ft. 6 in.
Boiler, diam	60⅝ in.
Height of stack	14 ft. 10¾ in.
Heating surface, firebox	149.00 sq. ft.
Heating surface, tubes	1,544.00 sq. ft.
Heating surface, total	1,693.00 sq. ft.
Grate surface	24.75 sq. ft.
Driving wheels, diam	78 in.
Engine truck wheels, diam	36 in.
Tender truck wheels, diam	36 in.

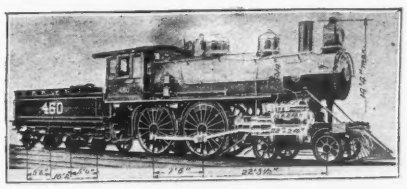


Fig. 3.

Cylinders	13 and 22 x 24 in.
Weight on drivers	83,860 lbs.
Weight on truck wheels	36,900 lbs.
Weight, total	120,760 lbs.
Wheel base, engine	22 ft. 3¾ in.
Wheel base, driving	7 ft. 6 in.
Boiler, diam	56¾ in.
Height of stack	14 ft. 4 in.
Heating surface, firebox	166.00 sq. ft.
Heating surface, tubes	1,530.00 sq. ft.
Heating surface, total	1,696.00 sq. ft.
Grate surface	38.59 sq. ft.
Driving wheels, diam	78 in.
Engine truck wheels, diam	36 in.
Tender truck wheels, diam.	36 in.

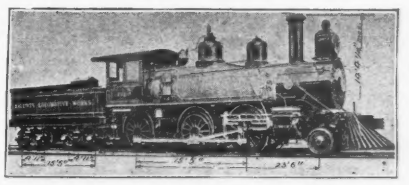


Fig. 8—*Engine* 13,405.

Cylinders	19 x 24 in.
Weight on drivers	91,340 lbs
Weight on truck wheels	17,702 lbs.
Weight, total	109,042 lbs.
Wheel base, engine	23 ft 6 in
Wheel base, driving	15 ft. 5 in.
Boiler, diam	59 in
Height of stack	14 ft 4¾ in.
Heating surface, firebox	137.50 sq. ft.
Heating surface, tubes	1,470.00 sq. ft.
Heating surface, total	1,607.50 sq. ft.
Grate surface	17.60 sq. ft.
Driving wheels, diam	56 in.
Engine truck wheels, diam	30 in.
Tender truck wheels, diam.	33 in.

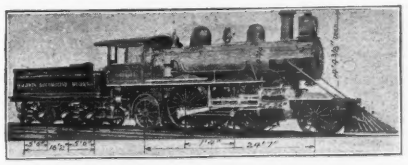


Fig. 4—*Engine* 13,350.

Cylinders	13 and 22 x 26 in.
Weight on drivers	83,130 lbs.
Weight, on truck wheels	43,500 lbs.
Weight, total	126,640 lbs.
Wheel base, engine	24 ft. 7 in.
Wheel base, driving	7 ft. 4 in.
Boiler, diam	54¾ in.
Height of stack	14 ft. 4⅝ in.
Heating surface, firebox	128.23 sq. ft.
Heating surface, tubes	1,349.90 sq. ft.
Heating surface, total	1,478.13 sq. ft.
Grate surface	24.77 sq. ft.
Driving wheels, diam	84¼ in.
Engine truck wheels, diam	54¼ in.
Tender truck wheels, diam	36⅝ in.

Ten-Wheel Compound Engine, No. 13,320—*No Cut.*

Cylinders	14 and 24 x 24 in.
Weight on drivers	93,580 lbs.
Weight on truck	38,100 lbs.
Weight, total	131,680 lbs.
Wheel base, engine	27 ft.
Wheel base, driving	15 ft. 4 in.
Boiler diam	58¾ in.
Height of stack	14 ft. 4¼ in.
Heating surface, firebox	156.27 sq. ft.
Heating surface, tubes	1,668.19 sq. ft.
Heating surface, total	1,824.46 sq. ft
Grate surface	18.7 sq. ft.
Driving wheels, diam	72 in.
Engine truck wheels, diam	33¼ in.
Tender truck wheels, diam	33 in.

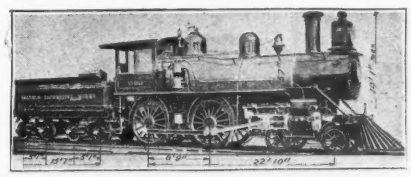


Fig. 5—*Engine* 13,400.

Cylinders	18 x 24 in.
Weight on drivers	84,560 lbs.
Weight on truck wheels	36,400 lbs.
Weight, total	100,960 lbs.
Wheel base, engine	22 ft. 10 in.
Wheel base, driving	8 ft. 9 in.
Boiler, diam	57 in.
Height of stack	14 ft. 1 in.
Heating surface, firebox	142.00 sq. ft.
Heating surface, tubes	1,394.00 sq. ft.
Heating surface, total	1,536.00 sq. ft.
Grate surface	17.60 sq. ft.
Driving wheels, diam	68 in.
Engine truck wheels, diam	33 in.
Tender truck wheels, diam	33 in.

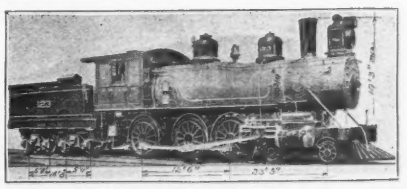


Fig. 10—*Engine* 123.

Cylinders	21 x 24 in.
Weight on drivers	101,000 lbs.
Weight on truck wheels	26,000 lbs.
Weight, total	127,000 lbs.
Wheel base, engine	23 ft. 3 in.
Wheel base, driving	12 ft. 6 in.
Boiler, diam	60¾ in.
Height of stack	14 ft. 3 in.
Heating surface, firebox	185.00 sq. ft.
Heating surface, tubes	1,822.00 sq. ft.
Heating surface, total	2,007.00 sq. ft.
Grate surface	28.00 sq. ft.
Driving wheels, diam	56 in.
Engine truck wheels, diam	26 in.
Tender truck wheels, diam	33 in.

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Cut number.	Name of builde
1	Baldwin Locomo Works
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13	Baldwin Locomo Works
14	Baldwin Locomo Works
15	Baldwin Locomo Works
16	Schenectady Loco tive Works
17	Schenectady Loco tive Works
18	Schenectady Loco tive Works
19	Schenectady Loco tive Works

r.	Name of company for which built.	Simple or compound. Kind of fuel. Gauge. Name or number.	Centre to centre, main connecting rod. Horizontal thickness of piston. Kind of piston packing. Piston rod, diameter. Size of steam ports.	Exhaust ports, size. Valve, greatest travel. Valve, outside lap. Valve inside lap. Valve, lead.	Journals, driving axle, size. Journal, truck axle, size. Journal, main crank pin, size. Journal, coupling rod, size.	Boiler, type. Boiler, material in barrel. Boiler, thickness of barrel. Boiler, kind of horizontal seams. Boiler, kind of circumferential seams.	Tubes, ma Tubes, nu Tubes, diame side. Tubes, lengt tube plate. Firebox, le
tive	Baltimore & Ohio	Simple Bituminous coal 4 ft. 8½ in. No. 858	7 ft. 5½ in. 6¾ in. C. I. rings sprung into solid head 3½ in. 19 in. × 1⅝ in.	19 × 2¾ in. 6 in. 1 in. None in. inside; $\frac{3}{32}$ outside	8 × 9½ in. 5 × 10 in. 5¾ × 5¾ in. 4½ × 4½ in.	Straight Steel $\frac{7}{16}$ in. Butt joint, double covering strips Double riveted	Iron, No. 11 251 2 in. 11 ft., 10 107$\frac{11}{16}$ in
tive	Philadelphia & Reading	Four cylinder compound Anthracite coal 4 ft. 8½ in. No. 694	8 ft. ½ in. 4¾ in. C. I. rings sprung in solid head 3½ in. 1½ × 24 in., circular	4½ × 24 in., circular 5 in. H. P., $\frac{7}{8}$ in.; L. P., ⅝ in. H. P., ⅛ in. negative; L. P., none H. P., ⅛ in.; L. P., ⅜ in.	8½ × 12 in. 6½ × 10 in. 5½ × 6 in. F., 5½ in.; B., 6 in. dia. × 4 in. long	Straight, Wootten firebox Steel ⅝ in. Butt, double cover. strips Double riveted	Iron, No. 13 324 1½ in. 10 ft. 0 i 9 ft. 6 in
tive	Central of New Jersey	Four cylinder compound Anthracite coal 4 ft. 8½ in. No. 450.	.... 4¾ in. C. I. rings sprung in solid head 3½ in. 19 × 1½ in.	19½ in. × 5½ in. 5¼ in. H. P., ⅞ in.; L. P., ⅝ in. None H. P., ⅛ in.; L. P., ⅜ in.	8 × 12 in. 5½ × 8 in. 5½ × 5½ in.	Wagon top Steel . . . . . . Butt, double cover. strips Single and double riveted	Iron 250 2 in. 11 ft. 10 131$\frac{15}{16}$ in
tive		Four cylinder compound Bituminous coal 4 ft. 8½ in. "Columbia," No. 13,350	8 ft. 9½ in. 4¾ in. C. I. rings sprung on solid head 3½ in. 24 × 1½ in., circular	24 × 4½ in. 5½ in. H. P., ⅞ in.; L. P., ⅝ in. H. P., ⅛ in. negative; L. P., none H. P., ⅛ in.; L. P., ⅜ in.	8½ × 12 in. 6½ × 10 in. 5½ × 6 in. F., 5¼ × 4 in.; B., 6 × 4 in.	Straight Steel ⅝ in. Butt and double covering strips Single and double rive ed	Iron, No. 12 198 2 in. 13 ft. 1¼ 84$\frac{3}{16}$ in.
tive		Simple Bituminous coal 4 ft. 8½ in. No. 13,400	7 ft. 1⅝ in. 4¾ in. C. I. rings sprung on solid head 3 in. 16 × 1¼ in.	16 × 2½ in. 5½ in. ¾ in. None $\frac{3}{32}$ in.	8 × 8½ in. 5 × 10 in. 5 × 5 in.	Wagon-top Steel $\frac{7}{16}$ in. Butt and double covering strips Single riveted	Iron, No. 13 214 2 in. 10 ft. 11¾ 74 in.
tive		Four cylinder compound Bituminous coal 3 ft. 5¾ in. No. 13,351	6 ft. 11 in. 4¾ in. C. I. rings sprung on solid head 2¼ in. 15¾ × 1½ in., circular	15¾ × 2¼ in. circular 4¾ in. H. P., $\frac{9}{16}$ in.; L. P., ½ in. None H. P., $\frac{1}{16}$ in.; L. P., ⅛ in.	6½ × 7 in. 4 × 6½ in. 3½ × 3½ in. 3¾ dia. × 3 in., and 3 × 3 in.	Wagon-top Steel $\frac{7}{16}$ and ½ in. Butt, with double cove ing strips Lap jo nt	Iron, No. 13 140 2 in. 12 ft. 10 i 52$\frac{7}{16}$ in.
tive	Baltimore & Ohio	Four cylinder compound Bituminous coal 4 ft. 8½ in. "Director General," No. 859	7 ft. 2¾ in. 4¾ in. C. I. rings sprung on solid head 3½ in. 24 × 1½ in., circular	24 × 4½ in.; circular. 5 in. H. P., ⅞ in.; L. P., ⅝ in. None H. P., ⅛ in.; L. P., ⅜ in.	8 × 9½ in. 5 × 10 in. 5¾ × 5¾ in. F., 6 × 4½ in.; B., 4½ × 4½ in.	Straight Steel ..... Butt, with double covering strips Double riveted	Iron, No. 11 251 2 in. 11 ft. 10 i 107$\frac{7}{16}$ in.
tive		Simple Bituminous coal 4 ft. 8½ in. No. 13,405	7 ft. 3½ in. 4¾ in. C. I. rings sprung on solid head 3¼ in. 1⅜ × 18 in.	18 × 3¼ in. 5½ in. ¾ in. $\frac{1}{16}$ in. $\frac{1}{16}$ in.	8 × 8½ in. 4¼ × 8 in. 5½ × 3½ in. and 5¼ × 5¼ in.	Wagon-top Steel ..... Butt, with double covering strips Double riveted	Iron, No. 13 246 2 in. 11 ft. 6 in 73$\frac{15}{16}$ in.
tive		Four cylinder compound Bituminous coal 4 ft. 8½ in. No 13,320	10 ft. 3¼ in. 4¾ in. C. I. rings sprung on solid head 3¾ in. 24 × 1½ in., circular	24 × 4½ in., circular 5 in. H. P., ⅞ in.; L. P., ⅝ in. None H. P., ⅛ in.; L. P., ⅜ in.	8 × 10 in. 5 × 10 in. 6 ×6 in. 6½ × 4¾ and 4½ × 4 in.	Wagon-top Steel ⅝ and $\frac{1}{16}$ in. Butt, with double covering strips Double riveted	Iron, No. 12 236 2 in. 13 ft. 6 in 78⅜ in.
tive	Baltimore & Ohio Southwestern	Simple Bituminous coal 4 ft. 8½ in. No. 123	9 ft. 4½ in. 4¾ in. Dunbar 3½ in. 1⅜ × 1⅝ in.	19 × 2¾ in. 5½ in. 1 in. None ⅛ in.	8 × 8½ in. 5 × 10 in. 5½ × 5½ in. 4 × 3½ in.	Wagon-top Steel ⅝ and $\frac{11}{16}$ in. Butt with double covering strips Single riveted	Iron, No. 12 223 2¼ in. 13 ft. 3¾ i 119⅞ in.
tive	Norfolk & Western	Four-cylinder compound Bituminous coal 4 ft. 9 in. No. 330	10 ft. ¾ in. 4¾ in. C. I. rings sprung into solid head 3¾ in. 24 × 1½ in.	24 × 4½ in. 5 in. H. P., ⅞ in.; L. P., ⅜ in. None H. P., ⅛ in.; L. P., ⅜ in.	7 × 8 in. 4 × 8 in. 5½ × 6 in.	Belpaire Steel .... Butt, 6 rows rivets, double covering strips Single and double	Iron 194 2½ in. 13 ft. 7¼ i 106¾ in.
tive	Nacional Mexicano	Four-cylinder compound Bituminous coal 3 ft. No. 162	8 ft. 2 in. 4¾ in. C. I. rings sprung into T-ring 2⅜ in. 16¼ × 1¼ in. circular	16¾ × 5¾ in., circular 5 in. H. P., ⅝ in.; L. P. ½ in., None H. P., ⅛ in.; L. P., ¼ in.	6¼ × 7 in. 4¼ × 8 in. 4¼ × 4¼ in. F. and B., 3½ × 3 in.; M., 4½ × 4¼ in.	Straight, Wootten firebox Steel ½ in. Butt, with double covering strips, double riveted Single riveted	Steel, No. 12 132 2 in. 11 ft. 9⅛ i 83$\frac{15}{16}$ in.
tive	New York, Lake Erie & Western	Four-cylinder compound Anthracite coal 4 ft. 8½ in. No. 805	9 ft. 8½ in. 6 in. C. I. rings sprung into solid head 4 in. 28½ × 2 in. circular	2⅝ × 8 in., circular 6 in. H. P., ⅞ in.; L. P., ⅝ in. None H. P., $\frac{1}{16}$ in.; L. P., $\frac{5}{16}$ in.	9 × 10 in. 5 × 10 in. 7 × 7½ in. F. and B., 4½ × 3½ in.; M., 7½ × 5½ in.; L. M., 5 × 5 in.	Straight Steel ¾ in. Butt, with double covering strips Double riveted lap	Iron, No. 11 354 2 in. 12 ft. ¼ in 131$\frac{5}{16}$ in.
tive	Wellman Iron & Steel Co.	Simple Bituminous coal 2 ft. 6 in. No. 7	3 ft. 4 in. 3 in. C. I. rings sprung into solid head 1¼ in. 4½ × ⅝ in.	4½ × 1¼ in. 3 in ½ in. $\frac{1}{32}$ in. $\frac{1}{32}$ in.	3¼ × 6 in. .... 2 × 2¼ in. 2¼ × 2 in.	Straight Steel $\frac{5}{16}$ in. Double riveted Single riveted	Iron, No. 13 W 46 1½ in. 6 ft. ½ in. 20⅛ in.
tive		Simple Wood 4 ft. 8½ in. No. 13,361	7 ft. 3 in. 4¾ in. C. I. rings sprung into solid head 2¼ in. 13 × 1⅛ in.	13 × 2½ in. 5 in. ¾ in. $\frac{1}{32}$ in. $\frac{1}{16}$ in.	6 × 8 in. 4¼ × 7½ in. 3½ × 3½ in. 3 × 3 in.	Straight Steel ⅝ in. Lap seams, double riveted Single riveted	Iron, No. 13 W 117 2 in. 10 ft. 1 ¾ i 49$\frac{5}{16}$ in.
omo-	Chicago & Northwestern	Simple Bituminous coal 4 ft. 8½ in. Columbus, No. 400	..... 5¼ in. Cast iron rings 3½ in. 18 × 1¼ in.	18 × 2¾ in. 5½ in. ⅞ in. $\frac{5}{32}$ in. $\frac{1}{16}$ in.	7½ × 8 in. 5½ × 9 in. 6 × 5½ in. M., 6¼ × 5 in.; F. and B., 5 × 3⅝ in.	Extended wagon-top Steel $\frac{7}{16}$ in. Sextuple riveted, butt joint Double	Iron, No. 11 W 268 2 in. 12 ft. 6 in. 77$\frac{13}{16}$ in.
omo-	Mohawk & Malone	Two-cylinder compound Bituminous coal 4 ft. 8½ in. No. 61	..... 4¾ in. and 5¾ in. Cast iron rings. 4 in. L. P., 21 × 2⅝ in.; H. P., 19 × 2⅝ in.	H. P., 19 × 3 in.; L. P., 21 × 3 in. 5½ in. ⅝ in. None $\frac{1}{16}$ in.	8½ × 9 in. 6 × 10 in. 6 × 6 in. M., 6½ × 6¼ in.; F. and B., 5 × 3¾ in.	Wagon-top Steel ¼, $\frac{9}{16}$, ⅝ in. Sextuple riveted, butt joint Double	Iron, No. 11 W 301 2 in. 12 ft. 108$\frac{5}{16}$ in.
omo-	Duluth & Iron Range	Simple Bituminous coal 4 ft. 8½ in. No. 60	..... 5½ in. Cast iron rings 4 in. 18 × 1¼ in.	18 × 3 in. 5½ in. ¾ in. $\frac{3}{32}$ in. $\frac{1}{16}$ in.	8½ × 9 in. 5 × 8 in. 6 × 6 in. M., 6½ × 5¼ in.; F., 5½ × 3¾ in.; B., 5 × 3¾ in.	Straight Steel ⅝ and $\frac{11}{16}$ in. Sextuple riveted, butt joint Double	Iron, No. 12 W 289 2¼ in. 13 ft. 6 in. 120⅛ in.
omo-	Schenectady Locomotive Works	Simple Bituminous coal 4 ft. 8½ in.	..... 5¼ in. Cast iron rings. 3¼ in. 16 × 1¼ in.	16 × 2½ in. 5½ in. ¾ in. $\frac{3}{32}$ in. $\frac{1}{16}$ in.	7½ × 8½ in. ..... 4½ × 4½ in. M., 5 × 5 in.; F. and B., 4½ × 3½ in.	Straight Steel ½ in. Quadruple riveted, lap joint Doub'e	Iron, No. 13 W 200 2 in. 11 ft. 96⅜ in.

BALDWIN AND SCHENECTADY LOCOMOTIVES EXHIBITED AT THE WORLD'S COLUMBIAN

Explanation of Table.—The first line of the heading in each column refers to the first line of data for each engine; the second line or the second line of da

Tubes, material. Tubes, number. Tubes, diameter outside. Tubes, length over tube plate. Firebox, length.	Firebox, width. Firebox, depth. Water space, width. Material of outside shell of firebox. Thickness of outside shell of firebox.	Material inside of firebox. Thickness of firebox. Material firebox tube sheet. Material smokebox tube sheet. Thickness tube sheets.	Crown plate stayed with— Diameter and height of dome. Working steam press. per square inch. Kind of grate.	Tender, weight empty. Journals, tender axles—size. Blast nozzle, kind. Blast nozzles, diameters.	Tender, fuel capacity. Tank, water capacity. Wheel-base, total, engine and tender. Total length of engine and tender over all.
Iron, No. 11 W. G. 251 2 in. 11 ft., 10 in. 107 11/16 in.	33 7/8 in 69 1/2 in., F.; 54 1/8 in., B. 3 in., S. and R ; 4 in , F. Steel 5/16 in.	Steel S. and B., 5/16 in.; C., 3/8 in. Steel Steel 1/2 in.	Radial stays, 1 in. dia. 30 3/4 × 22 in. 165 lbs. Rocking	34,000 lbs. 4 1/4 × 8 in. Double. 3 1/4, 3 1/2, 3 3/4 in.	4 1/2 tons 3,500 galls. 47 ft. 7 in. 59 ft. 1 1/2 in. .....
Iron, No. 13 W. G. 324 1 1/2 in. 10 ft. 0 in. 9 ft. 6 in.	9 1/2 in. 38 3/4 in. 3 1/2 in. Steel 5/8 in.	Steel All, 5/16 in. Steel Steel 1/2 in.	Radial stays, 1 1/2 in. dia. 27 1/4 × 21 in. 180 lbs. Water tubes, cast iron bars	33,8.0 lbs. 4 1/2 × 8 in. Variable 5 1/2 in.	6 tons 4,000 galls. 47 ft. 3 in. 62 ft. 7 1/2 in. .....
Iron 250 2 in. 11 ft. 10 in. 131 1/16 in.	42 1/2 in. F., 65 in.; B., 55 3/4 in. S. and B., 3 in.; F., 4 in. Steel 5/16 in.	Steel S. and B., 5/16 in.; C., 3/8 in. Steel ..... 1/2 in.	Radial stays, 1 1/2 in. dia. 31 1/2 × 20 1/2 in. 180 lbs. W'ter t'b's a'd pull-o't bars	32,500 lbs. 5 × 8 in. Double 3 1/4, 3 1/2, 3 3/4 in.	6.8 tons 3,500 galls. 49 ft. 2 1/2 in. 59 ft. 9 1/16 in. .....
Iron, No. 12 W. G. 198 2 in. 13 ft. 1 1/4 in. 84 5/16 in.	42 5/8 in. F., 61 3/4 in.; B., 63 in. S , 3 in.; F. and B., 4 in. Steel 5/16 in.	Steel S. and B., 5/16 in.; C., 3/8 in. Steel Steel 1/2 in.	Radial stays, 1 1/2 in. dia. 31 1/2 × 20 1/2 in. 180 lbs. Rocking and drop	33,200 lbs. 4 1/2 × 8 in. Single 4 1/2, 4 3/4, 5 in.	6 8 tons 3,600 galls. 50 ft. 8 7/16 in. 63 ft. 4 1/16 in. ....
Iron, No. 13 W. G. 214 2 in. 10 ft. 11 3/8 in 74 in.	33 3/8 in. F., 80 1/16 in.; B., 78 1/2 in. S. and B , 3 in.; F , 4 in. Steel 1/2 in.	Steel S. and B , 5/16 in.; C., 3/8 in. Steel .... 1/2 in.	Crown bars 32 × 20 in. 160 lbs. Rocking bar and drop plate	27 500 lbs. 3 3/4 × 7 in. Double, high 3, 3 1/4, 3 1/2 in.	6 tons 3,000 galls. 46 ft. 6 in. 57 ft. 0 in. .....
Iron, No. 13 W. G. 140 2 in. 10 ft. 10 in. 52 7/16 in.	27 5/8 in. F., 55 1/2 in.; B., 54 1/2 in. S. and B., 2 1/2 in.; F., 3 1/2 in Steel 1/2 in.	Steel S. and B., 5/16 in.; C., 3/8 in. Steel Steel 1/2 in.	Crown bars 27 1/2 × 22 in. 180 lbs. Plain bars and drop plate	23,600 lbs. 3 1/4 × 6 in. Double, high 2 1/4, 2 1/2, 2 3/4 in.	5 tons 2,000 galls. 41 ft. 6 in 50 ft. 1 1/2 in. .....
Iron, No. 11 W. G. 251 2 in. 11 ft. 10 in. 107 7/16 in.	37 1/4 in F., 69 1/2 in.; B , 54 1/2 in. S. and B., 3 in.; F., 4 in. Steel 5/16 in.	Steel S. and B., 5/16 in.; C., 3/8 in. Steel Steel 1/2 in.	Radial stays, 1 1/2 in. dia. 31 1/2 × 22 in. 180 lbs. Rocking	31,000 lbs. 4 1/4 × 8 in. Double 3 1/4, 3 1/2, 3 3/4 in.	4 1/2 tons 3,500 galls. 48 ft. 59 ft. 6 1/2 in. .....
Iron, No. 13 W. G. 246 2 in. 11 ft. 6 in. 73 1/16 in.	34 3/8 in. F., 77 3/4 in.; B., 76 3/4 in. S. and B., 3 in.; F., 4 in. Steel T. and S , 5/16 in.; B., 1/2 in	Steel S. and B , 5/16 in.; C., 3/8 in. ..... 1/2 in.	Radial stays 31 1/2 × 3 1/2 in. 160 lbs. Rocking and drop	29,600 lbs. 4 1/4 × 8 in. Double, high 3, 3 1/4, 3 1/2 in.	6 1/4 tons 3,500 galls. 46 ft. 10 in. 56 ft. 7 in. .....
Iron, No. 12 W. G. 236 2 in. 13 ft. 6 in. 78 3/8 in.	34 3/8 in. F., 86 3/4 in.; B , 84 3/4 in. S. and B., 3 in.; F., 4 in. Steel 1/2 in.	Steel S. and B., 5/16 in.; C., 3/8 in. Steel Steel 1/2 in.	Radial stays, 1 1/4 in. dia. 31 1/2 × 19 in. 180 lbs. Rocking bar and drop plate	33,200 lbs. 4 1/2 × 8 in. Single. 5, 5 1/4, 5 1/2 in.	5 1/2 tons 3 600 galls. 59 ft. 11 1/2 in. 62 ft. 1 in. .. ..
Iron, No. 12 W. G. 223 2 1/4 in. 13 ft. 3 3/4 in. 119 7/16 in.	33 3/4 in. 76 1/2 in. S. and B , 3 in.; F., 4 in. Steel 1/2 in.	Steel All, 3/8 in. Steel Steel 1/2 in	Staybolts 1 1/2 in. dia. 32 × 24 in. 160 lbs. Rocki'g bars and drop plate	29,650 lbs. 4 1/4 × 8 in. Double 3 1/2, 3 1/2, 3 3/4 in.	6 tons 3,500 galls. 49 ft. 9 1/4 in. 59 ft. 8 3/4 in. .....
Iron 194 2 1/2 in. 13 ft. 7 1/4 in. 106 3/4 in.	41 3/4 in. F., 63 1/2 in.; B , 61 1/2 in. S., 3 1/2 in ; B. and F., 4 1/2 in. Steel 1/2 in.	Steel S. and B., 5/16 in.; C., 3/8 in. Steel ..... 1/2 in.	Parallel staybolts, 1 in. dia. 31 1/2 × 30 in. 180 lbs. Rocking	35,500 lbs 4 × 8 in. Single 5, 5 1/4 5 1/2 in.	5.3) tons 4,000 galls. 49 ft. 1 1/8 in. 59 ft. 8 1/16 in. .....
Steel, No. 12 W. G. 132 2 in. 11 ft. 9 1/8 in. 83 1/16 in.	24 3/4 in. F., 55 3/4 in ; B., 44 1/2 in. F., 3 1/2 in.; S. and B., 1/2 in. Steel 1/2 in.	Steel S. and B., 5/16 in.; C., 3/8 in. Steel Steel 1/2 in.	Radial stays, 1 1/2 in. dia. 28 × 22 in. 18 lbs. Rocking bars	31,200 lbs. 4 1/4 × 8 in. Single 3 1/2, 3 3/4, 4 in.	4 1/2 tons 3,000 galls. 47 ft. 10 1/2 in. 55 ft. 3 in. ... .
Iron, No. 11 W. G. 351 2 in. 12 ft. 1/4 in. 131 5/16 in.	98 1/2 in. F., 54 in.; B., 50 in. All, 3 1/2 in. Steel 1/2 in.	Steel S. and B., 5/16 in.; C., 3/8 in. Steel Steel F . 3/4 in.; B 1/2 in.	Radial stays, 1 1/2 in. dia 29 3/4 × 26 in. 18 lbs. Rocking bars	34,000 lbs. 4 1/2 × 9 in. Double, high 4 1/2, 4 3/4, 5 in.	8 tons 4,500 galls. 53 ft. 4 1/2 in. 63 ft. 8 in. .....
Iron, No. 13 W. G. 46 1 1/2 in. 6 ft. 1/2 in. 20 1/16 in.	25 3/4 in. 27 in. F., 2 × 2 1/2 in.; S. and B., 2 in. Steel 5/16 in.	Steel 5/16 in. Steel Steel 3/8 in.	Radial stays, 7/8 in. dia. 16 × 19 in. 130 lbs. Plain bars and dead-plate	.... Single .. .. 2, 2 1/4 in.	..... 130 galls. ..... 15 ft. 3 in. .....
Iron, No. 13 W. G. 117 2 in. 10 ft. 1 3/4 in. 49 5/16 in.	34 3/8 in. 50 1/2 in. S. and B , 3 in., F., 4 in. Steel 5/8 in.	Steel S. and B., 5/16 in.; C., 3/8 in. Steel Steel 1/2 in.	Radial stays, 1 in. dia. 23 1/2 × 31 in. 130 lbs. Plain bars and dead-plate	.... Double ..... 2 1/4, 2 1/2, 2 3/4 in.	1 1/2 cords wood 1,000 galls. ....
Iron, No. 11 W. G. 268 2 in. 12 ft. 6 in. 77 11/16 in.	33 in. 84 in. F., 4 in.; S. and B., 3 1/2 in. Steel	Steel S. and C., 3/8 in.; B., 5/16 in. Steel Steel 1/2 in.	Radial, 1 in. dia. .... 170 lbs. Rocking	32 900 lbs. 4 1/2 × 8 in. Double 3 1/4, 3 1/2, 3 3/4 in.	7 tons 4,000 galls. 47 ft. 9 1/2 in. 58 ft. 4 3/8 in. ....
Iron, No. 11 W. G. 301 2 in. 12 ft. 108 5/16 in.	41 3/8 in. F., 62 3/4 in.; B. 59 3/4 in. F., 4 in.; S. and B., 3 in. Steel	Steel S. and B., 5/16 in.; C., 3/8 in. Steel Steel 1/2 in.	Crown bars, 6 × 3/4 in. ..... 180 lbs. Rocking	35,000 lbs 4 1/2 × 8 in. Single 5, 5 1/4, 5 1/4 in.	8 tons 4,000 galls. 47 ft. 2 1/2 in. 57 ft. 1 1/2 in. ... .
Iron, No. 12 W. G. 289 2 1/4 in. 13 ft. 6 in. 120 1/16 in.	41 3/8 in. F., 65 3/4 in ; B , 62 1/4 in. F., 4 in.; S. and B., 3 1/2 in. Steel	Steel S. and B., 5/16 in.; C., 3/8 in. Steel Steel 5/16 in.	Crown bars, 7 × 7/8 in. .... 180 lbs. Rocking	31,000 lbs. 4 1/4 × 7 in. Single 5 1/4, 5 1/2, 5 3/4 in.	6 1/2 tons 3,500 galls. 51 ft. 7 in. 59 ft 10 3/8 in. .....
Iron, No. 13 W. G. 200 2 in. 11 ft. 96 5/8 in.	33 7/8 in. F., 59 in.; B., 56 in. F., 4 in.; S and B., 3 in. Steel	Steel S. and B., 5/16 in.; C., 3/8 in. Steel Steel 1/2 in.	Crown bars, 5 × 3/4 in. ..... 150 lbs. Rocking	29,300 lbs. 3 3/4 × 7 in. Double. 2 3/8, 2 1/8, 3 3/8 in.	3 1/2 tons 3,000 galls. 38 ft. 6 in. 51 ft. 4 3/8 in. .....

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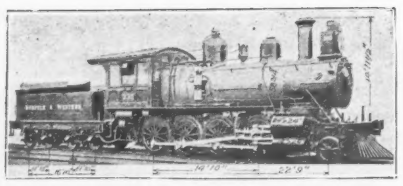


Fig. 11—*Engine* 330.

Cylinders.....14 and 21 x 24 in.	Heating surface, firebox....168.67 sq. ft.
Weight on drivers ..120,600 lbs.	Heating surface, tubes . 1,709.61 sq. ft.
Weight on truck wheels .... 15,200 lbs.	Heating surface, total....1,878.28 sq. ft.
Weight, total.....135,800 lbs.	Grate surface..... 30.95 sq. ft.
Wheel base, engine.....22 ft. 9 in.	Driving wheels, diam.....56 in.
Wheel base, driving.....14 ft. 10 in.	Engine truck wheels, diam.....30 in.
Boiler, diam.....58¾ in.	Tender truck wheels, diam.....33 in.
Height of stack.....14 ft. 11⅛ in.	

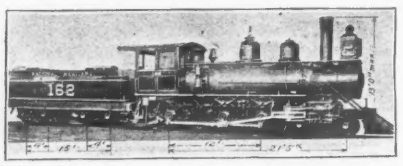


Fig. 12.

Cylinders.....10 and 17 x 20 in.	Heating surface, firebox....84.59 sq. ft.
Weight on drivers.....57,060 lbs.	Heating surface, tubes.... 809.18 sq. ft.
Weight on truck wheels....21,540 lbs.	Heating surface, total .....893.77 sq. ft.
Weight, total.....78,600 lbs.	Grate surface ..... 14.14 sq. ft.
Wheel base, engine .....21 ft. 5 in.	Driving wheels, diam .....46 in.
Wheel base, driving.....12 ft.	Engine truck wheels, diam.....36 in.
Boiler, diam.....47 in.	Tender truck wheels, diam.....30 in.
Height of stack .....13 ft.	

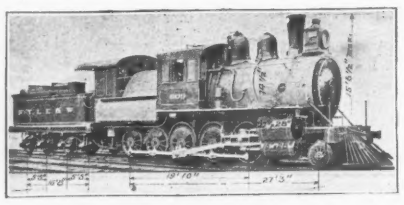


Fig. 13—*Engine* 805.

Cylinders.....16 and 27 x 28 in.	Heating surface, firebox....234 3 sq. ft.
Weight on drivers ..... 172,000 lbs.	Heating surface, tubes ...2,208.8 sq. ft.
Weight on truck wheels.....23,000 lbs	Heating surface, total. ... 2,443.1 sq. ft.
Weight, total..... 195,000 lbs.	Grate surface..... 89.5 sq. ft.
Wheel base, engine.....27 ft. 3 in.	Driving wheels, diam..... 50 in.
Wheel base, driving..... 19 ft. 10 in.	Engine truck wheels, diam.....30 in.
Boiler, diam.....73½ in.	Tender truck wheels, diam.....33 in.
Height of stack. .. .. 15 ft 6⅝ in.	

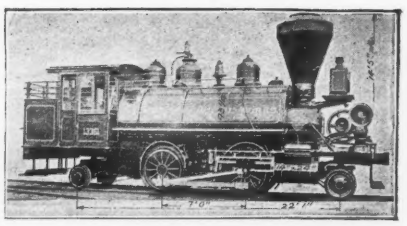


Fig. 15—*Engine* 13,361.

Cylinders.....14 x 24 in.	Height of stack.....14 ft. 5 in.
Weight on drivers..... 46,630 lbs.	Heating surface, firebox ...61.00 sq. ft.
Weight on truck wheels .....25,500 lbs.	Heating surface, tubes... .660.00 sq. ft.
Weight, total... ....72,130 lbs.	Heating surface, total.....721.00 sq. ft.
Wheel base, engine..... 22 ft. 1 in.	Grate surface ..... .11.70 sq. ft.
Wheel base, driving..... 7 ft.	Driving wheels, diam..... .44 in.
Boiler, diam .... .43¼ in.	Engine truck wheels, dia., 24 in. & 26 in.

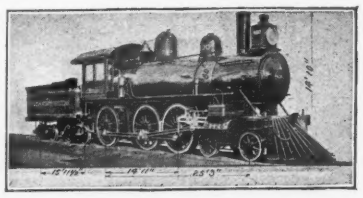


Fig. 16—*Engine* 400.

Cylinders.....19 x 26 in.	Heating surface, firebox...164 00 sq. ft.
Weight on drivers.....96,000 lbs.	Heating surface, tubes....1,642.30 sq. ft.
Weight on truck wheels..... 33,000 lbs.	Heating surface, total....1,806.30 sq. ft.
Weight, total.....129,000 lbs.	Grate surface..... ....17.80 sq. ft.
Wheel base, engine ..... 25 ft. 3 in.	Driving wheels, diam..... 67 in.
Wheel base, driving.....14 ft. 11 in.	Engine truck wheels, diam.....33 in.
Boiler, diam.....60 in.	Tender truck wheels, diam.....33 in
Height of stack..... .....14 ft. 10 in.	

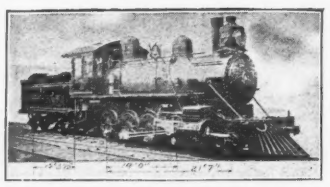


Fig. 17—*Engine* 61.

Cylinders.....22 and 32 x 26 in.	Heating surface, firebox...168.20 sq. ft.
Weight on drivers..... ... .. 132,000 lbs.	Heating surface, tubes. .1,878.00 sq. ft.
Weight on truck wheels.. ...17,000 lbs.	Heating surface, total....2,046.20 sq. ft.
Weight, total.....149,000 lbs.	Grate surface..... 31.10 sq. ft.
Wheel base, engine.....21 ft. 7 in.	Driving wheels, diam ..... . 51 in.
Wheel base, drivers.....14 ft.	Engine truck wheels, diam.....30 in.
Boiler, diam . ...62 in.	Tender truck wheels, diam.... ...33 in.

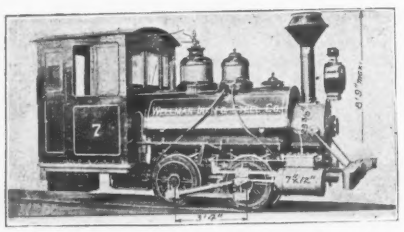


Fig. 14.

Cylinders.....7 x 13 in.	Height of stack..... ...8 ft. 9 in.
Weight on drivers..... ..14,150 lbs.	Heating surface, firebox.....18.3 sq. ft.
Weight, total .....14,150 lbs.	Heating surface, tubes..... 104.1 sq. ft.
Wheel base, engine.... .....3 ft. 4 in.	Heating surface, total... .. 122.4 sq. ft.
Wheel base, driving..... ...3 ft. 4 in.	Grate surface ..... 3 81 sq. ft.
Boiler, diam..... ....23⅝ in.	Driving wheels, diam..... ...26 in.

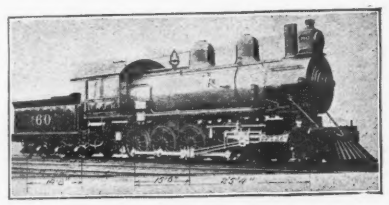


Fig. 18—*Engine* 60.

Cylinders .....22 x 26 in.	Heating surface, firebox...189.70 sq. ft.
Weight on drivers.....139,000 lbs.	Heating surface, tubes...2,212.60 sq. ft.
Weight on truck wheels..... 30,000 lbs.	Heating surface, total....2,402.30 sq. ft.
Weight, total.....169,000 lbs.	Grate surface . ... 34.50 sq. ft.
Wheel base, engine.....25 ft. 4 in.	Driving wheels, diam.....54 in.
Wheel base, driving.... ..15 ft. 6 in.	Engine truck wheels, diam.....28 in.
Boiler, diam.....72 in.	Tender truck wheels, diam.....33 in.

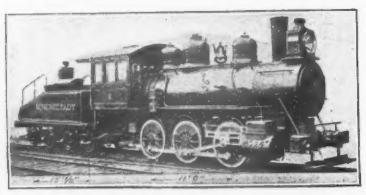


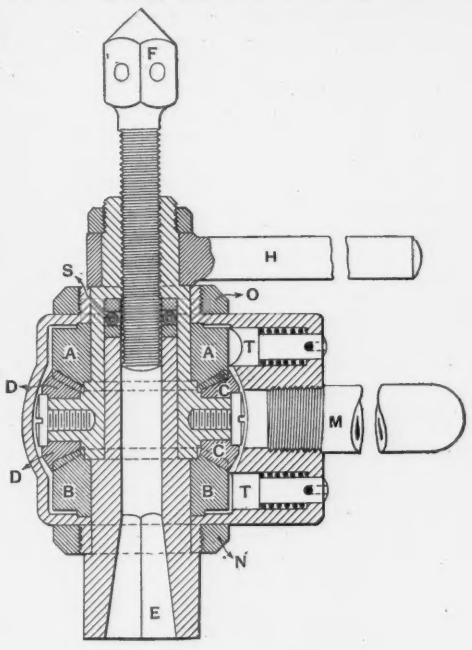
Fig. 19.

Cylinders ....18 x 24 in.	Heating surface, firebox... 131.20 sq. ft.
Weight on drivers.....99,000 lbs.	Heating surface, tubes...1,147.50 sq. ft.
Weight, total ....99,000 lbs.	Heating surface, total... .1,278.70 sq. ft.
Wheel base, engine .....11 ft.	Grate surface..... 22.60 sq. ft.
Wheel base, driving.....11 ft.	Driving wheels, diam ..... . 51 in
Boiler, diam..... ..... 58 in.	Tender truck wheels, diam .....30 in.

Watson's Shop Drill.

A very ingenious device for a shop drill is that designed and patented by Mr. M. D. Watson, and a cross section of which is shown in the engraving. Referring to the figure: *A* and *B* are bevel pinions with axes parallel to the tool; *C* and *D* are smaller pinions engaging with *A* and *B* and pivoted with axes perpendicular to the line of tool; *E* is the spindle in which is the socket for the cutting tool. Pinion *B* is secured to this spindle, but *A* is loose. The pawls *T*, *T* are held in the casing, into which the lever *M* is screwed, in such a manner that when the lever is turned from left to right a pawl engages in pinion *B*, and the cutting tool is turned in the direction the lever is moving; when the lever is turned in the opposite direction, a pawl engages with pinion *A*, and the motion communicated through the pinions *C* and *D* turns *B* in the opposite direction; so that in whichever direction the lever is turned the tool is operated in the cutting direction. The pressure necessary to make the tool cut is obtained by means of the screw *F*, and transmitted through the ball bearing *S*. The lever *H* is a locking lever to prevent the tail nut from turning. The casing into which the lever *M* is threaded is cast in halves and held together by two nuts *N* and *O*.

This is a convenient tool for any shop, and a large number of them is being sold to railroads for the use of trackmen, to be used in drilling rails. As the drill is turned in the cutting direction when the lever is turned in either direction, a hole is drilled much quicker than could be done with the ordinary single acting ratchet.



Watson's Shop Drill.

Miner's Improved Draft Rigging.

The accompanying illustration shows a draft rigging recently brought out by Mr. W. H. Miner, of the Hutchins Refrigerator Car Company. Fig. 1 shows the tail-bolt application and fig. 2 the combined application of strap and tail-bolt, with the Ludlow coupler. It will be observed that the cast or malleable iron plates bolted to the centre or draft sills in which the follower plates move are longer than usual, and that each has three stops, one each end and one in the centre. It is also seen that the tail-bolt is of greater length than usual and that at the centre of fig. 1 is a forged collar, and at each end a nut of standard size. This arrangement, together with the use of four follower plates, allows the use of two springs of the usual size. Good results have been obtained in some cases by using double coil springs of the usual diameter, one spring being 7 in. and the other 8 in. long, the inside coil of the 8 in. spring being placed within the outside coil of the 7 in. spring, and *vice versa*, thus obtaining graduated movement and strength to resist shock. It is usual, however, in applying this draft rigging to heavy and strongly built cars, to place these springs in the order in which they are intended to be used. A collar on the centre of the tail-bolt is unnecessary when a strap is used, as shown in fig. 2. The arrangement furnishes an efficient and durable means of increasing the capacity of the draft rigging to take up shocks from buffing blows and thus greatly protect the draft sills and decrease the liability of damaging contents of the car. The line drawing fig. 3 shows the arrangement in detail with a link-and-pin coupler. This draft rigging is in quite extensive use on cars of the Hutchins Refrigerator Car Company and the California Fruit Transportation Company, and is giving excellent satisfaction.

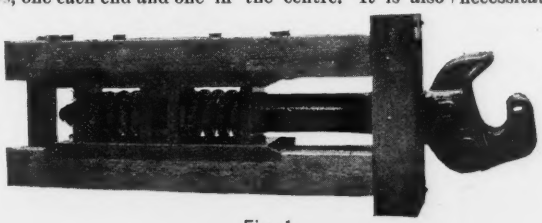


Fig. 1.

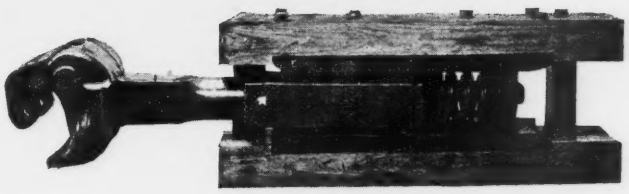


Fig. 2.

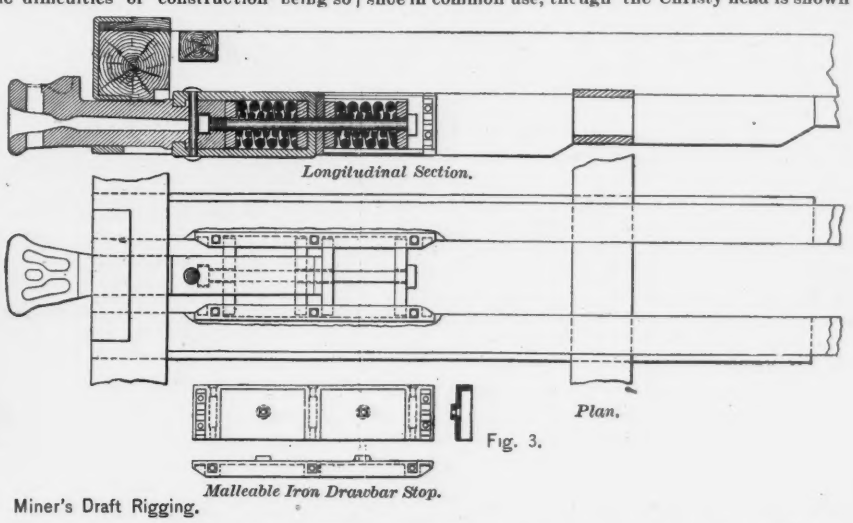


Fig. 3.

Miner's Draft Rigging.

Japanese Railroads.

The Government of Japan has now in hand plans for the construction of 14 new railroad lines. In 1868 the first attempt was made to introduce railroads in Japan, and those who suggested this new method of transport put forward a very comprehensive scheme, which was for a great central artery traversing the island of Nippon, connecting the old and new capital of the empire, Yedo and Kioto. This artery was to touch at Yokohama, the most important commercial port in Japan, and to throw out a branch at Tsourouga, a port on the West Coast. It was, however, impossible to immediately put this scheme, in its entirety, into effect—the plan was of too ambitious a character; but a proof of the firm basis upon which it was conceived is given by the small trunk lines which have been successfully opened to working, and which have combined to form almost entirely the line first proposed.

The railroad question in Japan was carefully watched by English contractors, and the material required for the first line came entirely from the United Kingdom, so that that country benefited to a considerable extent from the expenditure of £620,000 necessitated by its construction. It was not long before the great artery projected in 1868 was commenced from the other end and rails were lain between Kobé and Osaka, with an extension to Adjikava, in the south of Kioto. For a length of 22 miles an expenditure of £41,000 per mile was necessitated, the difficulties of construction being so great, one of these being the construction of a bridge 398 yards in length. In 1876 the line was carried from Osaka to Kioto, over a length of 27 miles, costing, on the average, £21,000 per mile.

In 1883 a line was constructed in the island of Yeso, placing the mining centre of Poronaï in communication with the port of Temiga, passing by Sapporo. Then a branch line was made, with a length of 49 miles, connecting the port of Tsourouga with Septson and Ogaki. The Japanese Railroad Company, which was established in 1882, commenced by building the line from Tokio to Tangasaki and Mayrbaski, and immediately afterward took in hand certain branch lines of considerable commercial importance. These were followed by an extension of the system from Tokio to Sandaï, while the state inaugurated the lines from Yokohama to Kodzu, from Slanga to Ogaki, from Tangasaki to Yokodowa, from Naozetson to Sikiyama, and finally the line from the sulphur mines of Koushiroko in the island of Yeso.

At the end of 1885 the total length of railroad in Japan was only 264 miles, while now it exceeds 1,428 miles, of which 894 belong to various companies, and these are expected to be taken over by the state.

At present the state and the private companies have their Japanese engineers, and if the national workshops of Shinbasi now supply part of the materials of construction and of the rolling stock, there is still room for a very considerable foreign importation. According to the latest statistical returns iron rails were imported into Japan from the United Kingdom in 1890 to the value of £145,400, and wagons to the value of £92,670, while the locomotives arriving from the same country represented a very considerable amount. In 1891 the value of similar articles imported showed a slight falling off, but the values in this case amounted respectively to £78,715 and £35,595. Germany sent rails in 1890 to the value of £45,100 and £31,710 in 1891. The share of Belgium in this trade amounted in value to £13,650 and £3 410.

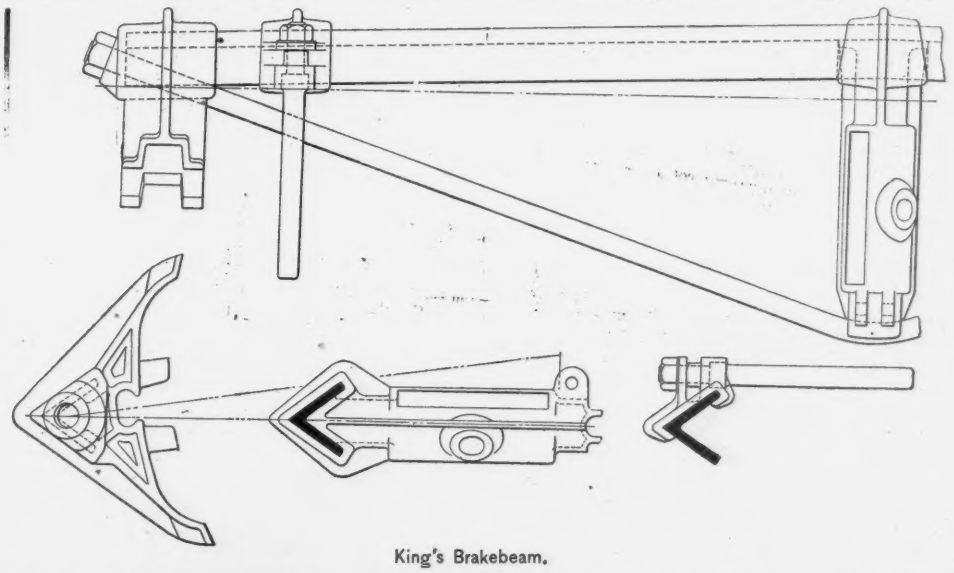
As regards locomotives the Japanese State Railroad authorities possess a vast building and repairing shop at Kobé. Hitherto little has been done beyond the repairing and fitting of carriages and wagons effected by the aid of materials imported and also of home production. Recently a new experiment of some importance has been commenced in the direction of the building of a locomotive.

The most important portions, such as the frame, wheels, springs, pipes, plates, etc., have still to be obtained from abroad, but notwithstanding this the Kobé workshop claims to be able to turn out engines on such conditions as will obviate the necessity of relying upon the importation of costly engines from Europe and America. In two or three months it will be possible to judge if the experiment is really successful. In the meanwhile it may be stated that, in the price of a locomotive arriving in Japan, three distinct factors are to be considered, the cost of the materials, labor, and finally the freight and insurance, etc., the latter especially being high. The Japanese authorities count on the saving to be effected in this respect and on the cheapness of native labor in order to put an end as far as possible to their indebtedness to foreign builders.—*Herepath's Journal.*

King's Brakebeam.

The illustration gives a good idea of the construction of a brakebeam lately brought out by Mr. Chas. H. King, Chief Draftsman of the Michigan-Peninsular Car Co., of Detroit, Mich. This is of the usual type of metal brakebeams, and can be arranged to hold any shoe in common use, though the Christy head is shown in the illustration. The compression member is made of an angle iron of the requisite weight and size for the service for which the beam is intended, and the tension member an iron bar of circular section passing through the head which caps the end of the angle iron compression member. The ends of these tension members are upset and threaded for the nut, which affords a means for securing and maintaining the necessary initial tension.

The strut, head and attachments for the wheel guard are of malleable iron. This beam offers good facilities for painting and inspection and repairs.



King's Brakebeam.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The contract which a passenger makes with the railroad to carry his baggage in the baggage car has no visible form except in the ticket which he buys: he procures that as evidence that he has paid for the transportation of himself *and* his trunk. This is shown in the third case in our Railroad Law column this week, where the New York Supreme Court held that a baggage check was not a contract. This case illustrates the reasonableness and necessity of having a rule that checks must not be issued beyond the point to which the ticket reads. The check is only an adjunct for the convenient carrying out of the contract embodied in the ticket. It must be assumed that in this New York suit the passenger had succeeded in getting a check farther than his ticket warranted, for if he had had a ticket he need not have fought for any rights on his baggage check. And if he had had a ticket his suit would have been an easy one, if we may judge by a case that was decided in this same court, and reported in the *Railroad Gazette* of May 26 (the sixth case). In that case it was held that the road selling the through ticket must settle for baggage destroyed on the connecting line, even though the ticket contained a clause disclaiming such responsibility, and asserting that the selling company acted only as agent. This interpretation of law would, in many cases, be a great convenience to the public, especially when dealing with railroads which move as slowly as possible in settling claims and which seem to try to make the claimant as much trouble as possible; but in other cases it would only serve to aid the passenger in annoying the wrong railroad. The case is not exactly parallel to that of a bill of lading for a shipment of freight sent over two or more railroads, for in the case of freight the claimant is sure to be at one end of the route, while the owner of baggage is often present in person at the place where the loss or damage occurs.

The fifth case in to-day's Railroad Law column is of interest to every railroad which has an electric street railroad among its neighbors. A vital element in the success of most of these electric roads is cheapness of first cost, and the fight to make the projectors spend sufficient money to insure reasonable safety at a crossing is a hard one in nearly every case. The conditions are so variable that no one case gives much light on the best way of settling of another, and this Pennsylvania case is only a preliminary skirmish any way; but it affords a starting point or landmark. It gives judicial authority to the dictum that the establishment of an electric railroad in a street makes that street a more dangerous thing for a railroad to deal with, and justifies it in interposing objections. The estimated cost of insuring safety in this case, $7,000, may not have much meaning in the next case that comes up, but it will be well to bear the sum in mind, nevertheless. Some electric roads will complain very loudly at a proposition to spend *one* thousand dollars. Another case in the "Railroad Law" published May 26 (No. 18) deserves passing notice, that wherein Mr. Wellenhoffer was denied damages for being injured at a crossing where there was an automatic electric bell which had been out of order for a year. The Court decided that as the plaintiff was familiar with the crossing and must have known that the bell was unreliable he should not claim any protection by means of it. This is doubtless a good quality of justice *for him;* just what he deserves; but we should be inclined to sympathize with him if he were somewhat exasperated at seeing the company escape a just punishment for such a flagrant piece of recklessness. To maintain a delusive signal at a crossing is, of course, worse than to have no signal at all. Some railroad officers seem to forget that in using highway crossing signals we necessarily ignore an important principle of safety which is availed of in most other signals, to wit, the principle that any defect or derangement of apparatus shall make itself known by giving a danger signal. In using a signal, for giving indications that mean life or death, without the benefit of that principle, the employment of the very highest quality of care and inspection becomes an absolute necessity.

Among some new regulations on the Canadian Pacific, according to a Winnipeg paper, is one "relating to the checking of baggage. All commercial men must have their baggage checked 15 minutes previous to the departure of trains, and other passengers five minutes before; otherwise the baggage will be held over until the next train." This is an excellent rule, if it could only be carried out in practice. The reporter's term "commercial men" probably means all passengers with heavy trunks which have to be weighed and charged for. It is an imposition on other passengers to keep them waiting while five valuable minutes are being spent on a ton of sample cases, as is often done at stations where one baggageman has to attend to all of the work, but as long as drummers are so skillful and persistent in getting what they want, and the average passenger is comparatively so modest, the imposition will probably continue. At such places as Port Arthur and Kamanistiqua, where there is no competing railroad, the baggageman can probably get the drummers to come to the station in season, but at most places the only remedial measure of much value is to see that the station baggageman cultivates the proper combination of tact and firmness, so that ordinary passengers shall not be inconvenienced by the drummers' custom of using the baggage car for freight business. A rigid rule is of little or no value, because much of the time it is not needed, and when it is most needed it is likely to break down.

Another instance recently published where baggage regulations seem to have been injudiciously rigid was that of some bicycles offered to the Boston & Albany at Adams, Mass. It appears that a number of riders who encountered a storm some miles from home offered a dozen machines, more or less, at one time, and the whole lot was refused. Apparently the regulation of the road required such baggage to be turned over to the express company. There are good arguments in favor of such a regulation, and where it can be enforced without delaying the passenger or his wheel it may be all right, for a bicycle is a troublesome and bulky piece of freight, and breakages are likely to be costly; but a good way to make friends among the traveling public is to humor their crotchets, when it does not cost much, and this desire to take a bicycle along with them is one of those crotchets. If it is only made clear that bicycles are not legitimate baggage, and cannot be taken when there is not ample room for them; that, therefore, a favor is being granted; and that the owner must assume the extra risks, the business can not only be done without loss, but probably with some profit. The English railroads, in carrying horses all over the country by passenger train, for the accommodation of passengers, doubtless make a good deal of money. It is true that they are dealing with a wealthy class, and can get good fees; but the Englishman is the last man to waste money on railroads, and it is likely that a plain American bicycler can be made as profitable a customer as the English hunting man, in proportion to the money and civility invested in carrying him and his mount.

The New York Central's Exposition Flyer is reported to be carrying nearly full loads of through passengers, and the advertisements of the road now state that this train is only for such. At the same time officers of the Pennsylvania are telling Philadelphia reporters that the trains of that road are running heavily loaded with full rate passengers. "The Columbian Express runs in four sections, and most of the time the Limited has two." It will be remembered that there is now an extra fare on the Columbian as well as on the Chicago limited, though not so large by a dollar. These facts tend to support the view of the trunk line traffic officers, who resist the newspaper clamor for reduced rates, that the sleeping cars of the several roads will be fully utilized during the World's Fair at regular rates. At the same time day cars do not seem to be greatly crowded on any road, and the Trunk Line Association officers are giving out reports that a meeting will soon be held at which excursion trains, without sleepers, will be authorized, to carry passengers to Chicago at about half price. This, it should be borne in mind by the newspaper writers, is what has been contemplated all along. The vague and leisurely way in which this move is made indicates, however, that there is still a good deal of fear that if a heavy reduction is made it may demoralize rates in a dangerous manner. In "Central Traffic" territory half-rate excursions have already been decided upon, as will be seen by the Chicago letter in the Traffic columns. The Lake Shore & Michigan Southern, which put on some half-dozen new trains, very soon found that it had done too much, and two trains between Cleveland and Chicago, Nos. 24 and 28, were taken off at the end of one week. A few days later one or two trains from Buffalo, including No. 17, were discontinued, and the fast night trains between Pittsburgh and Chicago fared the same way. Evidently there had been some wild guessing somewhere.

Standard Specifications for Rails.

That eminent mathematician and philosopher, Professor Bartlett, used to love to remind his classes that "there is nothing absolute but God." So, to our correspondent who asks us for standard specifications for rails, we say that, bearing in mind the limitations of human things, there are no specifications that are absolutely the best to-day or that are certain to endure many years. At the same time it is possible to lay down a few principles which, if not final, do at least embody the best practice of to-day, and in following which one cannot go far astray. We trust that our correspondent will overlook the fact that what we shall say is but a restatement of elementary matter and, indeed, of things that we have said many times; for it is given to few people other than populist statesmen to have a fresh and complete set of ideas on every subject of human inquiry.

We suppose that the engineer will have adopted a correct section, for this if not actually more important than good specifications must at any rate precede them. As a correct section the majority of enlightened opinion has settled down to a section in which the metal is so distributed as to minimize the cooling strains. Fortunately that section also insures a sufficient working of the metal in the head of the rail, permits working at a low temperature, and gives the minimum of cold straightening. That section will be illustrated in the series of standard sections which the committee of the American Society of Civil Engineers will eventually present. Just how the metal will be distributed throughout the various sections in this series we cannot say, but the typical rail should have about these proportions; metal in the head 40 per cent., in the flange 37 per cent., and in the web 23. The head is broad as compared with its depth.

With the section so designed and with a guarantee of wear from the maker, say, a guarantee for five years against breakage or unusual wear, the specifications might be, and we think should be, quite simple. Chemical specifications after all can only be approximate guides. Rails which analyze practically the same wear very differently. This has been a notorious fact for some years. It has long been obvious to students of the matter that the toughness and wearing qualities of rails depend upon other matters than their chemical composition; but in order to secure the requisite hardness and to help control the brittleness it is well to specify certain limits for the chemical constituents, and probably about the best that can be done for mills where good pig iron is available is to specify carbon from .4 to .5 for rails of medium weight, say from 60 to 70 lbs., and about .6 for rails above 70 lbs. to the yard, and in either case the phosphorus should be kept below .1. But if the geographical position of the buyer is such that it seems necessary to buy of mills that cannot command low phosphorous pig at reasonable prices, the carbon must be kept down lower than the limits indicated above.

There are certain elements in the treatment of the metal which should be insisted upon and which are probably more important than chemical specifications. The ingots should be kept upright until the metal has

set so far as to prevent piping or bleeding, and the buyer should make sure that all piped metal is cut off from the top of the ingot. It is hardly less important to specify that the steel shall not be overheated at any step.

It seems desirable then to specify that test ingots should be taken at sufficient intervals and that test bars made from those ingots should be bent cold to a right angle with a sledge. This will give a measure of the toughness and may detect cold shuts or laminations. The drop test is a matter of controversy, the highest steel rail doctors disagree as to its practicability and utility. One of the oldest professional inspectors, a believer in the drop test, says that rails high in phosphorus can by hot rolling and slow cooling "be made to stand a most vigorous drop test; but they get brittle in the track." Therefore the buyer may safely omit the drop test. But if he knows pretty definitely what information he wants to get by a drop test he had better get some expert to specify one which will give that information and will not delay the progress of the rails from the mill to the cars; for it is one of the elements of low cost of production to keep the metal moving all the time from the converter to delivery on board the cars.

It is of considerable importance that most of the straightening of rails should be done while they are hot, and that cold straightening should be finished before the rails are absolutely cold. A recognized evil of cold straightening is that the gag which is applied to take out one long bend is likely to introduce two short ones and make a rough riding rail. Moreover, "every blow of the gag is a bid for a break, and the harder the steel the greater the danger."*

These are the fundamentals of a good working specification. Beyond these there should be of course the customary provisions for finish, drawing and inspection at the mill.

Finally, what is perhaps most important of all for the ordinary buyer is the gaurantee of service from a responsible maker. With this it is pretty safe to make the specifications only moderately exacting. An engineer of much experience can make full specifications and take the responsibility; the average buyer will do better to fix the responsibility on the rail maker.

It is not presumed that specifications on these lines will get an ideal rail, but that they will get a good rail at commercial prices. If one is after the ideal rail it might, for example, be necessary to specify the modulus of elasticity, within some limits, to get a rail that will carry a large concentrated load without taking a permanent set, and that will best resist the severe surface strains of traffic. A rail approaching the ideal has recently been rolled in pretty large quantities, and we have published some accounts of tests of it. The chemical specification was

Carbon	.60
Phosphorus	.05 to .06
Silicon not to exceed	.08 to .10
Sulphur	.07
Manganese	.80 to 1

These rails were made from selected stock, and watched with great care all through the process of manufacture. The section was essentially what has been described above. These were tested with a 2,100-lb. drop falling 28 ft., and showed 55,000 to 60,000 lbs. per sq. in. elastic limit. It took three to five blows at 28 ft., supports 3 ft. apart, to break them, and it took tools of self-hardened steel to plane them, they were so hard and tough. Of course one could, if he chose, formulate chemical and physical specifications based on these results; but not all the rail mills could or would get the stock to make them from, and he would have to pay a special price. It might be economy to do so, but few boards of directors care much about posterity—the stockholders five years hence being posterity.

The Reading Rehabilitation.

The expected collapse of the Reading having occurred, though sooner than was looked for, the important question arises how to rehabilitate the finances, taking things as they are now. The statement of the Receivers made to the Court several months ago showed very large sums owing and also large assets not immediately available. The plan of readjustment gives a further condensed account of the situation. The floating debt of $20,000,000 is made up in brief as below:

Bills payable, Railroad Co	$4,380,000
" Coal and Iron Co	5,360,000
Materials, car service, etc	2,700,000
Taxes and coupons	1,300,000
Purchases of coal	1 250.000
Equipment notes	5,000,000
	$19,990,000

As an offset the combined companies hold current accounts and notes for coal sold, but principally large quantities of coal on hand at all the large cities east of the Missouri River. It will be seen that some of the above debts could in time be paid from the assets; but the street lenders are importunate. The Reading managers prefer to ask for the whole $20,000,000 in cash so as to have a working capital, something the eading Company has never yet had.

The syndicate which has underwritten the collateral trust 30-year 6 per cent bonds to be issued to the above amount of $20,000,000 make certain conditions. Some bonds on the outlying parts of the system—Poughkeepsie bridge and connecting lines for example—are to be scaled down; the Lehigh Valley is to accept five per cent. on its stock as rental instead of seven per cent. agreed upon a year ago; the first mortgage bondholders are asked to forego their right of foreclosure for five years by consenting to the purchase instead of the cancellation of their coupons during that period if found necessary, and the stockholders are asked to consent to a voting trust in favor of the syndicate and the present management for seven years, to give these men time to work out their plans for the complete restoration of the property. In return for these concessions the managers and syndicate agree to lend the company the large sum asked for.

The collateral to be put under this trust deed consists in part of bonds and stocks of branch roads and other enterprises, now in the Reading treasury or pledged for the bills payable outstanding. The income from these bonds is estimated by the Reading at $875,000 per annum, though no doubt a part, at least, of this sum is dependent upon the continued success of the present system. A national coal company is to be formed to sell the Reading coal at a commission, which will yield $850,000 annually. Also $10 000,000 of general mortgage bonds, which can be issued in 1898 under the terms of that mortgage. These are the principal items relied upon to pay the $1,200,000 annual interest upon the new bonds. It is believed that the real reliance of the syndicate is upon their hopes for the future success of the system if kept together and united for five or seven years, rather than upon the value of the collateral itself; and the best argument for the plan is in the theory that if a syndicate can be found to advance so large a sum on such a basis it is the part of wisdom for bond and stockholders to allow them to do so.

No doubt the syndicate, composed principally of Philadelphia men, has been influenced in subscribing by the fact that the preservation of the Reading system is believed to be of great importance to the anthracite trade and to the business interests of Philadelphia and eastern Pennsylvania. If the first mortgage is foreclosed there is danger that the stockholders will lose everything and that the old and valuable charter will also be lost. This charter allows the Reading to hold coal lands and to do other coal business contrary to the constitution of Pennsylvania, which forbids these things; though being of later date, its prohibitions do not apply to the old Reading franchises. As the Reading under Gowen bought about 45 per cent. of the whole anthracite coal area and issued its bonds therefor, the loss of its charter rights would work a dismemberment of the whole system. For all these reasons, the business men and bankers of eastern Pennsylvania are anxious that the present position of the Reading and Lehigh Valley should be continued, and are willing to take some financial chances to that end.

It should also be remembered that the existing collieries can produce 10 or 15 per cent. more hard coal than can be annually consumed, and that some stronger unity than that of mere agreement is necessary if unregulated competition is not to cut prices and increase the yearly output, until complete bankruptcy for almost all in the trade would be the only result.

How to Examine Firebox Steel.

One of the most important committees appointed by the Master Mechanics' Association last year was that on tests of iron and steel. This committee was continued from the year before. The work is very important, and the subject is one on which good work can be done, but it requires a broad and general knowledge of the subject. One may easily fall into either one of two errors: (a) A recommendation of specifications for a class of material that is not practical to make; and, the other, (b) the ignoring of scientific methods in tests and chemical analyses of material.

What the working mechanical officer or engineer wants to know is the real value of laboratory tests, both physical and chemical, and he wants also some practical directions for watching steel in the process of manufacture. It is a well recognized fact that good steel can only be obtained by knowing two things; one, the physical quality of the steel after it is made, and the other the process of manufacture. There are certain technicalities in the manufacture of steel that are not generally known, and ignorance of these on the part of purchasers has in the past, and probably will in the future permit irresponsible steel makers to ship, even in the face of the ordinary inspector, inferior grades of steel to purchasers. In a recent analysis of the subject by a foreign steel manufacturer, who has had much experience with the highest grade of steel, the following general causes of faults in steel were given:

Faults in the furnaces are generally:

(a) "Raw" heats, so called, where the metal is not properly decarburized in the open hearth furnace and is cast at too low a temperature, which prevents the proper assimilation of the decarburizing elements and causes a non-homogeneous material.

(b) Cast at too high a temperature, causing boiling in the ingots and blow holes and laminations in the plate.

(c) Cast at too low a temperature, causing lapping of the ingots' sides and producing a film or lamination in the plate.

Some general directions were given as follows:

(a) Ingots for firebox plates should be cast somewhat proportional to the size and thickness of the plates they are to make. If this is not done the larger plates rolled from the same size ingots as the small plates will not be of as good quality, as there will always be a temptation to use the top, or bad part, of the ingot.

(b) It is preferable to heat the ingots that are to be hammered or squeezed, in a soaking furnace by raising them from the temperature at which they can be safely taken out of the ingot mold.

(c) In all cases, enough of the top of the ingot should be cut off. The temptation always is to cut off too little.

(d) If the ingots are for high class steel they should be hammered or squeezed on all sides and considerable of the top of the ingot cut off before the sheets are rolled. Many steel-makers cast a thin ingot and pass it directly into the rolls without hammering or squeezing, and such makers rely more upon the chemical constitution of the steel to gain tensile strength than upon the work put upon the metal.

For high class firebox steel the slabs should always be hammered or squeezed before being rolled, and should be first cross-rolled to a length equal to the width of the plate which is intended to be made. After this the slab should be reversed in the rolls and rolled cross-wise of the first rolling.

Some of the faults in rolling mills are:

(a) Improper cooling of plates by exposing to cold currents of air on one side, or by laying the plate on a cold metal surface.

(b) Reducing the thickness of the plates in the mills too quickly, thus reducing the cohesion of the particles in the plate, and thus reducing its toughness.

(c) Buckling of the plates, which produces intense local and internal strains.

(d) Rolling large plates at too low a heat, which permits the edges to cool before the middle and causes internal strains.

Some of the defects in working are:

(a) Working at a blue heat, which is the worst form of bad working.

(b) Local heating and working, which is almost as bad as working at a blue heat unless the plate is afterward annealed.

(c) Bad annealing due to ill constructed furnaces, which unevenly heat and unevenly cool the plates.

(d) Punching holes in an improper manner; that is, with improper punches and dies. This is not intended to apply to all punching, and is not intended to mean that drilling is necessary in place of punching. It only calls attention to the fact that a good plate may be badly damaged by the use of improper dies.

It is such general directions as the above that railroad men want in preparing specifications for steel and in forming instructions for inspectors. This is the class of work that the committee appointed by the Master Mechanics' Association, can best do to help the members. Steel making for fireboxes is a comparatively new art, and although it is much used all over the world for internally fired boilers for marine work, yet nowhere else than in the United States has it ever been made successful for locomotive work except perhaps in a few sets of fireboxes made at Leeds Forge, England, the makers of the Fox corrugated furnaces. In another column will be found some results obtained with steel fireboxes on the Paris, Lyons & Mediterranean road; and it is those results and the consideration of the subject by the Master Mechanics' Association that has led to these remarks.

The June reports of the Department of Agriculture make the acreage of winter wheat 12.2 points below that of last year. In Kansas, Missouri and Illinois, where the greatest reduction has taken place, the crop was destroyed by drought and extremely cold winter weather, and a good deal of it has been plowed under and sowed to other crops. The percentage of area of spring wheat for the whole country is 94. The condition of winter wheat has improved since the last monthly report very slightly, being now 75.5 per cent. The condition of

* R. W. Hunt, paper before Am. Inst. Mining Engineers, October, 1888.

spring wheat averages 86.4 per cent. The returns from the cotton area show that over a large part of it the development has been retarded by the cold weather and excessive rain. In a few localities dryness destroyed the seed. Much injury has been caused in certain regions by overflows. The average condition of the crop is 85.6 as compared with 85.9 last year. There is a slight increase of acreage.

The less one says about rapid transit matters in New York just now the better. Things are in a very delicate situation. The men who have recognized actual conditions and proposed possible plans have resigned; the one man who has failed to comprehend facts and who has time after time led the Commission up to a stone-wall holds the fort alone. But the resignations have not been accepted, and the Mayor thinks they ought not to be, for the accumulated knowledge in the minds of the commissioners is about all there is to show for a substantial expenditure of time and money. The astrologers of the daily newspapers are the only mortals who see into the future of the matter, and their vision is cross-eyed.

Thirty-four and one-half inches is now the legal standard height for the drawbars of freight cars on standard gauge railroads in the United States, engaged in interstate commerce, the Interstate Commerce Commission having issued its formal notice, in accordance with the Act of Congress of March 2, 1893. This notice simply repeats the language of the resolution of the American Railway Association, passed at the meeting of April 12 last, and it will be found in full in our advertising columns.

NEW PUBLICATIONS.

Biographical Directory of the Railway Officials of America. Edition of 1893. Published biennially by the *Railway Age and Northwestern Railroader;* Chicago, Ill.

The editor and publishers of this directory seem to think that it speaks for itself. At any rate, they pass from the title page immediately to the name of Edward Hale Abbott, President and Treasurer of the Wisconsin Central, etc., without the intervention of preface or introduction. Consequently, we do not even know how many names the volume contains, but by counting the names on half a dozen pages, taking the mean, and multiplying by 418 we arrive at 3,760. This, we are aware, is a dangerous method of establishing facts, but it is a very popular one and one which is used by many so-called statisticians and investigators with ponderous and overwhelming results. At least, it is probably safe to say that the volume contains somewhere between 3,500 and 4,000 names of persons in actual service on the railroads of the country. Each name is followed by the present title and address, and by a brief chronology of the life of the individual under notice. The whole is compactly arranged and excellently printed, making a convenient and useful book of reference.

American Society of Railroad Superintendents. Twenty-second meeting. C. A. Hammond, Secretary, Boston, Mass.

Secretary Hammond has issued the proceedings of the meeting held at Chicago, April 10 last. Mr. Platt's paper on block signals, which was given in the report of the meeting printed in the *Railroad Gazette* of April 14, is printed in full, and there is an appendix giving an illustrated description of Lattig's automatic electric semaphore.

Traffic Matters in Chicago.

World's Fair Passengers.—The week ending with the 10th inst. was an active one with the Chicago railroads. All the passenger trains were about as long as the locomotives could haul with economy and the coaches were well filled. The large increase in the passenger traffic since the opening of the month has been a surprise to even the railroad officers, and they have decided to put on excursion trains within a week. If, however, the travel increases in proportion with the gains made last week the extras will be found necessary at an earlier day than now proposed.

The present heavy influx of visitors is the more surprising because this month is a busy time with the farmers, and the same is true with regard to many other branches of industry. It is, therefore, reasonable to suppose that the attendance at the Fair by those classes has so far been very small in comparison with what may be expected 30 or 60 days forward. If, however, travel increases with the same rapidity the next 10 days as since the opening of the month, the railroads will find it necessary to increase their train service by putting on at least one additional daily. The managers of some of the leading Western lines say this can easily be done without detriment to the movement of freight, provided the extra passenger train is not run at the present high rate of speed maintained on the majority of the lines by regular trains.

Freight.—The grain traffic on the granger lines, while not up to the large volume shown in the returns for the week ending June 3, is still above the average at this season of the year, and heavier than anticipated. Comparing last week's receipts at Chicago with a year ago the increase was 2,570,000 bushels. The fact that the current month's arrivals have been so heavy in the face of very low prices indicates that stocks in the interior are still heavy. Advices obtained through reliable sources are also favorable for large crops of coarse grain, the acreage reports showing an increase over the area sown in 1892, and the crop more advanced. These statements are encouraging for future business.

Comparing other descriptions of freight delivered here the past week with the same time in 1892, there was an increase of 21,246 tons of coal and 6,118 tons of produce. The difference in the movement of other articles was slight except flour and live hogs, the former showing a decrease of 36,000 barrels, and the latter 86,000 head. The loss on hogs, however, was partly compensated by an increase in receipts of other live stock.

The outward movement of merchandise and miscellaneous freight was considerably larger than a year ago, and mainly consisted of property which pays the best rates. It would, therefore, seem that the railroads should show more than their average early summer earnings. The seaboard trunk lines have had fair deliveries of merchandise and other freights. Agents also report a free outward movement of grain and other products to what are termed local points; but the through shipments are trifling compared with the ability of the roads to handle. It is said, however, that both the through and local shipments were materially lessened by the deranged condition of the financial situation, which prevented many who had property to ship from drawing bills against consignments.

The following shows the number of carloads of grain and live stock at Chicago for the first five months of the current and preceding years:

	Grain cars.		Live stock cars.	
	1893.	1892.	1893.	1892.
Atchison, Topeka & Santa Fe	6,641	5,369	4,218	5,546
Chicago, Burlington & Quincy	18,476	14,493	24,051	29,923
Chicago, Rock Island & Pacific	6,716	9,382	11,903	15,111
Chicago & Alton	3,730	3,121	8,522	6,681
Chicago & Northwestern	11,680	13,195	23,842	28,155
Chicago & Eastern Illinois	2,469	1,673	1,648	1,592
Chicago, Milwaukee & St. Paul	12,879	11,293	17,218	19,404
Chicago & Great Western	4 980	3.4?9	3.355	4,478
Illinois Central	11,209	10,195	8,777	1,592
Wabash	2,653	2,335	7.477	4,777
Wisconsin Central	119	98	625	616
Through and special	12,966	12,572	.	.....
Total cars	94,518	87,154	111,699	117,875

It will be seen that the current year gained 7,364 carloads of grain and lost 6,196 cars of live stock, compared with last year. The latter was all on hogs, due to the short supply suitable for market. If, however, the extra tons of dressed beef received were added, they would more than cover the decrease in live stock. The grain cars designated as through and special represent grain shipped through from the West to Eastern markets, subject to inspection in Chicago on special tracks but as the State Grain Inspector does not keep an account of the cars received by each road, it is impossible to properly credit them to the lines by which they were delivered. It is known, however, that the great majority come by the Burlington & Quincy, Chicago, Rock Island & Pacific, Chicago & Northwestern, and Chicago, Milwaukee & St. Paul, and that each road should name its percentage of credit in proportion to its business given in the above tables.

The number of cars of live stock shipped east from Chicago over eight leading railroads from Jan. 1 to May 31 for four years compare as follows:

	1893. Cars.	1892. Cars.	1891. Cars.	1890. Cars.
Baltimore & Ohio	3,155	3,209	3,102	4,112
Chicago & Erie	1,212	1,570	1,492	1,274
Chicago & Grand Trunk	5,423	6,616	5,793	7,279
Lake Shore	9,866	11,600	9,970	8,454
Michigan Central	11,804	4,376	5,503	8,823
N. Y., C. & St. Louis	2,678	8,361	7,649	7,669
Fort Wayne	5,188	6,607	6,662	6,764
Pittsburgh, Cin. & St. Louis	787	1,024	485	564
Total cars	40,013	43,363	40,656	44,939

There was a very large increase in shipments of dressed beef the present year, and it more than compensates for the shrinkage in live stock.

CHICAGO, June 12, 1893.

Steel for Fireboxes—A French Study.

The Paris, Lyons & Mediterranean Railroad in 1888, influenced by American railroad practice, adopted experimentally, in 10 of its freight locomotives, the use of steel in place of copper for fireboxes. But four of them before the lapse of three years and under ordinary service required such extensive repairs that the company decided before proceeding further in this line to study carefully American practice; and as it was well aware of the satisfactory and economical results attained, and in order that no element for variation might enter into the comparative test it proposed, the company decided to purchase steel boiler plates of American manufacture for the locomotives to be used in such tests. The company's Associate Chief Engineer of Motive Power, M. E. Chabal, accompanied by M. Cottin, Director of Works, and M. Ducousso, Sub-chief of Shops, in pursuance with the above aim, spent about six weeks in the United States visiting some of the principal locomotive shops and such large steel mills as make a specialty of boiler steel. As a result of this visit M. Chabal has submitted an elaborate report showing conclusions drawn from information he has secured, which has been published in full in *Revue Générale des Chemins de Fer* for March.

M. Chabal prefaces his report with a description of the results obtained by his company in the trial of the 10 fireboxes above noted, the merely moderate success of which formed the motive for his trip to America.

At the end of 1888 and in the beginning of 1889 the P., L. & M. equipped 10 of its freight locomotives with steel fireboxes, the interior dimensions of which were as follows: Length, above, 1.296 m.; below, 1.358 m.; width, above, 1.072 m.; below, 1.013 m.; depth from crownsheet to frame, front, 1.526 m.; depth from crownsheet to frame, rear, 1.410 m. These fireboxes replaced copper ones in old locomotives, and in general dimensions, diameter and arrangement of staybolts and distribution of flues were the same. Formerly the old staybolts were made of copper, the new ones were of iron; the new flues, as the old, had safe ends of copper at the firebox end; the new fluesheet was 15 mm. thick in the tube section and 9 mm. below; the other sheets were of a uniform thickness of 9 mm. The steel employed was under a specification furnished by the P., L. & M. and cost in 1887, 28 fr. per 100 kilos (say 2¼c. per pound).

The construction of these fireboxes was, briefly stated, as follows: The sheets were delivered in a finished condition, having been carefully annealed according to specification. The work of reducing the lower section of the fluesheet to 9 mm. was performed in the railroad shop. The sheets were bent and rolled hot, and all holes (tube and rivet) drilled, not punched; after which the sheets were again annealed in a simple annealing furnace built for the purpose in the shops. The annealing was performed by bringing the sheets slowly (in about ten hours) to a bright cherry red, after which the steel was allowed to cool, requiring 70 to 80 hours to do so. In the final assembling of the sheets the rivet holes, which were originally drilled 2 mm. diam. scant, were carefully reamed.

The locomotives were distributed among five divisions, some of which have water very pure and others heavily charged with lime. A table showing the results of chemical analysis of these waters gives the best water in Saint Etienne .033 grammes of solid matter to the litre, and the poorest, in Marseilles, .34 grammes per litre. In Sept. 30, 1892, three of the fireboxes had not required heavy repairs beyond replacing some tubes and staybolts, their service being as follows:

Locomotive 1409	St. Etienne Div	85,934 km.
" 1524	Villeneuve-St. Georges Div	121,694 km.
" 1704	" " "	117,832 km.

(Villeneuve-St. Georges ranks third in the smallness of the amount of solid matter found in its waters, .248 grammes per litre (say 17.5 grains per gallon).

The seven fireboxes remaining have been subjected to repairs more or less heavy, briefly described as follows: Locomotive 1813 in July, 1890, was sent in because of a leak at the firehole ring, having run 38,878 km. on Dijon Divison. Upon examination it was found necessary to replace the firehole plate, and at the same time it was deemed advisable to replace the fluesheet, which was badly corroded inside and out. The new sheets were of steel, and the locomotive has since made 47,486 km. without further repair.

Locomotive 1737 in February, 1891, having made 68,993 km., on Marseilles Division, was sent to the shops on account of a long crack in the left side sheet, the face of the fracture being everywhere bright and showing no flaw. In January this locomotive was examined and its boiler was found by test to be in good condition. The boiler was emptied and the locomotive taken out of service until some repairs required in its machinery could be made. When ready for service the above boiler defect was discovered. In replacing the damaged sheet it was considered advisable to replace front and back sheets because badly corroded.

Locomotive 2360, to February, 1891, had made 59,886 km. on Dijon Division, when sent in for the same kind of repairs as required by locomotive 1813. Locomotive 2344 made, to April, 1891, 58,594 km. on Lyons-Mouche Division, when a crack in the left side sheet occurred. Eleven hours after its arrival at the engine-house its boiler was washed out with cold water; three hours afterward when the boiler was being refilled the crack was suddenly produced with a loud report. The locomotive was thereupon sent to the shops and steps taken to drop the firebox. When the head of one of the middle staybolts on the right side was struck a long crack in the sheet was produced extending above and below the staybolt struck. In the course of repairs a crack in one of the lower corners of the flue sheet was discovered. The various sheets affected were replaced and the engine made 10,643 km. more, when a defect developed in the firehole plate which necessitated further extensive repairs.

Locomotives 1591 on Marseilles Division, 1606 on Villeneuve-St. Georges and 2019 on St. Etienne divisions had made to the middle of 1892 110,246 km., 117,832 km., and 88,552 km., respectively, when it became necessary to send them in for heavy repairs: the first for deep corrosions in the lower corners of the firebox, the two others for bulgings in the back sheet about the firehole; in each case when the firebox was dropped, all sheets were found in such a state as to render replacement necessary; then the use of steel was abandoned in these three cases—copper succeeding it. The defects resulting in this experimental use of steel may be summed up as follows:

Deterioration of the sheets, production of bulgings and cracks in the doors or firehole plate where riveted to the hole ring. The French practice is to use an iron ring around the fire door, and as is shown, this defect appears also in copper fireboxes and would be escaped in American practice.

Leaks at the joints of the tubes in the fluesheet and in the lower corners of the firebox where the sheets are overlapped and riveted to the mud ring (lower frame). Leaks here corrode the fire side of the sheets, while others in the lower corners have completely destroyed the sheets in certain cases at points where the enveloping sheet is riveted. M. Chabal says, "In my opinion our workmen, being accustomed to the use of copper in the construction of fireboxes, do not exercise that care necessary in handling a metal so much harder, and that these leaks could be avoided if a little more precaution was used. I think also that the method of joining the tubes adopted in America, which will be described later, would give much better results than that employed by us."

Corrosions of the sheets on the water side, especially at the first row of rivets in the mud ring.

Cracks in the side sheets between the grate and crown-sheet, almost mid-length of the firebox. We shall see later that the Americans, who had this trouble at first, have much less now, and that they attribute these cracks to the quality of the steel and more especially to washing out with cold water.

In ordering the steel for the fireboxes of these locomotives specifications were furnished by the railroad company, which as far as they went were very complete These specifications covered: Quality of the pig iron which should be used in manfacturing; the conditions controlling the manufacture, such as building up of ingots, etc.; description of the tests for tenacity and ductility to which the steel would be subjected, and the tensile strength required. The specification of the tests for tensile strength was not more than 40 kilograms per square millimetre, with elongation not exceeding 25 per cent. in a length of 20 centimetres, the testpiece being planed to a rectangular form having the thickness of the sheet and a width of 30 millimetres. The chemical analysis of portions of the sheets that cracked in service was unsatisfactory, in that the results of different laboratories did not agree. However, M. Chabal felt justified in deciding that the presence of phosphorus and sulphur in the steel gave it a quality highly unsatisfactory for fireboxes.

M. Chabal makes a comparison of copper and steel fireboxes in first cost and expense of maintenance. As a result of this comparison he arrives at the following conclusions:

Steel fireboxes are not objectionable from the point of view of safety; and there is an incontestable advantage in their lighter weight, compared with copper fireboxes, which might be of advantage in high speed locomotives. In construction of steel fireboxes, much greater care is required than is exercised in the construction of copper fireboxes. Steel of a high degree of purity is indispensable. Washing out boilers with cold water must be absolutely prohibited. Inspections must be regularly and rigidly performed, and slight defects immediately repaired.

Finally, from the point of view of comparative expense, it does not appear to M. Chabal that steel fire boxes present any superiority over those of copper, as the latter are maintained by the Orleans company. The difference in the method of maintenance between the P., L. & M. and the Orleans is that in the former for even light repairs the firebox is dropped; and if the damage discovered is of any moment whatever, the entire sheet is replaced; while with the Orleans company local repairs are made as in America by patching, etc., whenever they can be, without dropping the fireboxes. The difference of expense can be easily imagined.

M. Chabal was commissioned by his company to purchase steel of American manufacturers while in this country. This is to be used in the construction of fireboxes with which a number of locomotives will be equipped and an experiment will be made to enable the P., L. & M. Company to decide whether or not a gain would result in the final adoption of steel in place of copper for this purpose.

In commenting upon American methods of construction, M. Chabal considers American practice in some respects somewhat superior to French, but in others an open question whether the results obtained are as economical in the end as they would be if the French practice was adopted.

The report recommends the abandonment of the fire-hole ring and the adoption of the American plan of riveting the inside and outside sheets together at this point. The brick arch is discussed briefly, but no conclusion is reached, inasmuch as opinion varies greatly, even among Americans. Attention is called to the lack of ordinary care exercised by the Americans in the use of steel. In America less care is used than the European workman is accustomed to exercise, even for work of much less importance than boiler construction. The practice of punching sheets instead of drilling them for rivets, etc., is questioned. Surprise is expressed that so little attention is paid to a final annealing of the steel after all machine work upon the sheets has been performed. The conclusion is reached that the care with which boliers are washed undoubtedly has much to do with the good results the Americans have obtained in the use of steel fireboxes; and that many of the repairs of defects as made by Americans are of the boldest character, mentioning particularly the closing up of small cracks by patch bolts, etc.

The French engineers were much surprised that Americans do not consider the purification of feedwater a question of greater importance, since the French roads are so careful to watch the condition of feed waters in different localities, using generally anti-incrustant liquids, etc., in order to deposit outside of the boiler the sulphates and carbonates with which the water may be charged; these liquids are placed regularly in the tender tanks. M. Chabal states that the general opinion in America among master mechanics is that sulphurous coal is very harmful to firebox sheets; yet he adds that he found sulphurous coal used to a very great extent, while he could not find any particular or extensive damage resulting from its use.

The Railroad Commerce Congress.

An interesting programme has been prepared by the committee having in charge the "Railway Commerce Congress" in connection with the World's Congress Auxiliary at Chicago. General meetings of the Department of Commerce and Finance are to be held each evening during the week commencing June 19 Representatives of the Railway Commerce Congress will participate each evening, and the following assignments have been made for the evening exercises:

Monday Evening, June 19.—Opening exercises. Address of welcome by Hon. C. C. Bonney, President of the Auxiliary. Response on behalf of Railway Commerce Congress by George R. Blanchard, Chairman of Committee on Railway Commerce Congress

Tuesday Evening, June 20.—Address on the results of railroad intercommunication upon producers and consumers. Hon. J. Sterling Morton, Secretary of Agriculture.

Wednesday Evening, June 21.—Address on the protection of public rights and interests in connection with railroad operation Hon. W. G. Veazey, Interstate Commerce Commissioner.

Thursday Evening, June 22.—Address on governmental regulation of transportation and its practical effects. Hon. John W. Cary, General Counsel, Chicago, Milwaukee & St. Paul Railway.

Friday Evening, June 23.—Address on the effect of competition upon railroad construction and operation. Aldace F. Walker.

Saturday Evening, June 24.—Address on railroad jurisprudence. By Hon. John F. Dillon, General Counsel, Union Pacific Railway.

In addition to the evening exercises sessions of the Railway Commerce Congress will be held daily, commencing at 10 o'clock a.m. The programme now arranged for the day exercises is as follows:

Tuesday, June 20—1. Opening address by George R. Blanchard. 2. The influence of railroads upon the settlement and development of new countries. Stuyvesant Fish, President Illinois Central Railroad. 3. Railroad accidents; their causes and the practical safeguards against them. H. S. Haines, Vice-P-esident Plant Railway System and President American Railway Association. 4. Safety devices applied to railroad cars. Gen. Horace Porter, Vice-President Pullman's Palace Car Co. 5. Railroad strikes; what should be done in the way of prevention and control. E. W. Meddaugh, General Solicitor Chicago & Grand Trunk Railway. 6. Police powers of railroad officials, etc. R. C. Richards, General Claim Agent Chicago and North Western Railway.

Wednesday, June 21.—1. Railroad legislation; its evolution, present conditions and future needs. Hon. Martin A. Knapp, Interstate Commerce Commissioner. 2. The influence of railroads upon the settlement and development of new countries. George P. Neele, Superintendent London & North-Western Railway. 3. The protection of private rights and interests in connection with railroad management and operation. Edward P. Ripley, Vice-President Chicago, Milwaukee & St. Paul Railway. 4 Railroad employés; what should be done for their protection and improvement? Kirtland H. Wade, General Manager California Southern Railway. 5. Superannuation of railroad officers and employés. L. J. Seargeant, General Manager Grand Trunk Railway.

Thursday, June 22.—1. Railroads of foreign countries. Representatives of various nations sending delegates to the World's Columbian Exposition. 2. International and interstate railroad arrangements. Geo. R. Blanchard, Commissioner Central Traffic Association; W. E. Curtis, Secretary Pan-American Congress; Lorenzo M. Johnson, General Manager Mexican International Railroad. 3. The evolution of the American railroad system. Jos. Nimmo, Jr. 4. Railroad traffic associations, clearing houses, etc. E. B. Stahlman, Commissioner Southern Railway & Steamship Association. 5. The statutory regulation of transportation and its results. Alfred G. Safford, Law Department Interstate Commerce Commission.

Friday, June 23.—1. Legal liabilities of common carriers. Geo. R. Peck, General Counsel Atchison, Topeka & Santa Fe Railway. 2. Baggage: Checking systems and delivery, claims for damages, limitations of liability, restrictions of quantity, etc. Marshall M. Kirkman, Vice-President Chicago & Northwestern Railway. 3. Passenger tickets: Defects of existing regulations, etc. Geo. H. Heafford, General Passenger Agent, Chicago, Milwaukee & St. Paul Railway. 4. Other papers on various subjects by selected authorities in this and other countries. 5. Public discussion: Are railroad passenger and freight charges too high?

TECHNICAL.

Manufacturing and Business.

The consolidation of the Hinson Car Coupler Co., of Chicago, and the Southern Malleable Iron Co., of Chattanooga, Tenn., has been completed. The capital stock of the new company is $2,800,000 and the Chicago concern will move to Chattanooga. The officers of the new company are: President, F. G. Kammerer, of Chicago; Vice-President, J. M. Elliott, Jr., Gadsden, Ala.; Secretary and Treasurer, G. F. Meehan, of Chattanooga. The directors are F. G. Kammerer, J. M. Elliott, W. P. Smith, J. E. Forsythe, of Chicago, and C. Herron, of Chattanooga. The new company will enlarge the present plant and also erect a steel mill.

The Central Indiana Car Works has been recently formed at Chicago with a capital stock of $500,000. The incorporators are A. C. Miller, N. D. Pontius and J. D. McKittrick.

The Baackes Wire Nail Co., of Cleveland, O., has made an assignment. The liabilities are put at $225,000, and the assets at $900,000. This is one of the largest wire nail factories in the United States. There is considerable confidence expressed that the concern will pay in full and resume business.

The Duluth Brass Works has just located at West Duluth, having removed from St. Paul, Minn., where it was known as the St. Paul Brass Works. The Duluth Brass Works occupies a three-story building, 40 × 80 ft., and will make a specialty of car brasses and other railroad work.

The J. H. & D. Lake Co., which manufactures all kinds of friction clutch pulleys, having outgrown its old quarters at Hornellsville, N. Y., has recently completed and removed to handsome new offices and foundry at Massillon, O., where, with enlarged facilities, it is prepared to meet the growing demands of the business.

The Minneapolis Air Brake Improvement Co. has filed articles of incorporation at Minneapolis, Minn.

The Northwestern Equipment Co., with office at 123 Monadnock Building, Chicago, will hereafter control the Hubbard anti-friction side-bearing having purchase it from the Car Truck Supply Co. The company reports that over 20,000 of these bearings have been used during the past two years. A recent examination was made of a number of bearings used during this period, and the rolls show no signs of either wear or flattening. The price of the bearing has been reduced from $10 to $6 50 per car. The Northwestern Equipment Co. also manufactures the Kewaunee brakebeam.

The Eureka slack adjuster, or Higham device, for hand adjustment of slack of the brake gear, is now manufactured by the Q & C Company, Chicago and New York, which is also putting on the market the new Q & C automatic brake slack adjuster.

Iron and Steel.

A meeting of the stockholders of the Pennsylvania Steel Co., which was recently placed in the hands of receivers, will be held on Aug. 15 to act upon the proposed increase of the bonded indebtedness of the company from $3,000,000 to $9,000,000. The increase is proposed in order to pay off the floating debt and permit the restoration of the property to the stockholders.

The Crescent Foundry and Construction Co., recently organized at Pittsburgh, has purchased the plant of the Crescent Foundry Co., Allegheny, Pa. The plant has been overhauled and put in first-class condition and is now in full operation. The new concern expects to do considerable railroad work, having received orders for castings from the Pittsburgh & Western Railroad and the Pittsburgh, Allegheny & Manchester Traction Co. The officials of the concern are D. R. Lean, Chairman; R. B. Lean, Treasurer, and N. A. Didier, Secretary and General Manager. The main office is located at the works, with branch office in Penn Building, Pittsburgh.

The Bessemer works at Pueblo, Col., are still running full time, and are three months behind with their orders. The rails are going entirely for betterments on Western roads. All the railroads of the West are doing a small business, and are making no extensions other than those already under contract.

New Stations and Shops.

The Toledo Bridge Co. is constructing another addition to its plant in East Toledo. The new structure is 90 ft. wide by 250 ft. long. It will be equipped with machinery for the manufacture of structural iron. It is expected that the building will be completed and in operation about the close of summer. The machinery for this building has been contracted for. When in operation about 100 additional men will be employed.

The Berlin Iron Bridge Co., of East Berlin, Conn., will build a new machine shop for the Fuller Iron Works, at Providence, R. I. The peculiarity of this shop will be that the sides are entirely of glass, under the patents lately granted the Berlin company for this construction. The building will be 90 ft. in width and 210 ft. in length.

The Cleveland & Pittsburgh Railroad has appropriated $8,000 to build a new passenger station at Steubenville, O. The company asks the city to vacate a part of a street, and the plans for the new building will depend upon whether this is done. The company also has plans prepared for a new freight building and offices to take the place of those destroyed by fire two years ago.

A Torpedo Boat for the Mississippi.

The torpedo boat "Ericsson," which is being built at Dubuque, Ia., for the United States, will be launched next month, and the governors of every state in the Mississippi Valley will be invited to take part in the ceremonies.

The Busk Tunnel.

The boring of the Busk tunnel has been completed except for a distance of 1,300 ft. The contractor expects to complete all the work so that trains can be run through the tunnel by Oct. 15. The Busk tunnel is being constructed between Busk and Ivanhoe stations on the Colorado Midland, and the total length will be 9,400 ft. The Busk Tunnel Railroad line is 3.25 miles long, and the saving of distance between Busk and Ivanhoe stations over the present Colorado Midland line is 6.93 miles. The contractor for the tunnel work is M. H. Keefe, who began work on the approaches in July, 1890, and on the heading for the east or Busk end of the tunnel in the following September.

The Rail Market.

So far as standard sections from mill are concerned the market is lifeless in the East. A feature of growing importance is the selling of rails fit to relay: Thus within the past ten days there have been placed in the New York market 12,000 tons of 60-lb. rails, 4,000 tons of 60-lb. rails, and 1,200 tons of 56-lb. rails at private terms. Conditions influencing the price of this character of material vary so widely that a close quotation is not practicable. It is known, however, that $19@$21 has been done, while there are reports of even lower figures. Competition on light sections is growing livelier, and relatively low prices are being made. In girder rails the mills are fairly well off.

It is reported that the Canadian Pacific has bought 15,000 tons of Moss Bay rails. It may be of interest in this connection to state that rails have lately sold as low as £3 10s. at works in England.—*Iron Age.*

A Transfer Steamer for Straits of Canso.

The Dominion Government has in course of construction a transfer steamer to be used in connection with the Intercolonial Railroad at the Straits of Canso. The boat will be 125 ft. in length, 30 ft. 4 in. molded breadth; 14 ft. 9 in. hold. The engines are compound, surface condensing, having cylinders 20 and 40 in. diameter, by 30-in. stroke; boiler, 12 ft. 6 in. in diameter, the shell being of plates one inch thick, carrying a working pressure of 130 lbs. a square inch. The steamer has three of Fox's corrugated furnaces.

Rome Locomotive and Machine Works.

The old New York Locomotive Works have been reorganized under the name of the Rome Locomotive and Machine Works. The officers of the company intend to take up more especially the rebuilding and repairing of locomotives. The plant is exceptionally well situated and equipped for doing this class of business; already a considerable amount of business of this character has been secured. The company will also be prepared to build engines as well as rebuild them and supply all parts of locomotives for engines built at the New York Locomotive Works. The new officers are: Thomas H. Stryker, President; W. B. Isham, Vice-President; E Comstock, Treasurer and Secretary.

English and American Rolling Stock in the Argentine Republic.

The inspecting officers of the Department of Engineers for the Province of Buenos Ayres have submitted a report on the rolling stock of the Southern and Western railroads of that country. They say that the whole of the rolling stock of the Great Southern is of English construction, sufficiently solid and of good material, but in designing it the nature of the railroads has been absolutely left out of consideration; consequently, there are extreme rigidity and excessive weight, completely unfitting the rolling stock for the roads over which it is to run. The result is said to be an excessive expenditure in the maintenance of way and rolling stock. Moreover, the cost of the English rolling stock is said to be unreasonably high. On the Western Railroad the locomotives are from the United States and are said to be simple in construction, but "of the highest order." Although severely taxed in consequence of the deficient number of locomotives they gave satisfactory results in all respects. In general, the verdict of the Department is altogether in favor of North American rolling stock because of greater simplicity, less weight and better system of suspension. First cost and cost of maintenance are lower than with European rolling stock, and in the American passenger cars the dead-weight per passenger is about half that of the English-built coaches.

Dredging in a Frozen River.

Mr. W. G. Reid, a Montreal contractor, who is building a drawbridge over the Red River, between Winnipeg, Man., and Norwood, made a novel use of a steam shovel in excavating for the foundations for three of the bridge piers during the past winter, when the ice in the river was 2½ ft. deep. An ordinary track was laid over the ice to within 30 ft. of a hole 22 × 60 ft. cut in the ice over the proposed location of the first pier, and then heavy sleepers, some 10 in. wide and 50 ft. long, were laid for the balance of the distance. The steam shovel was then run over this track to within 6 in. of the edge of the hole and there securely anchored with blocks and chains and put to work. The material excavated was discharged from the bucket upon sleds and hauled away. The steam shovel used was manufactured by the Vulcan Iron Works Co., of Toledo, O. Some slight alterations were made in the shovel to fit it for this particular work, the arms being lengthened to 35 ft. from end of dipper to end of arm, and the dipper thrown down 6 in. at the teeth to give it a proper bite.

THE SCRAP HEAP.

Notes.

The shops of the Union Pacific and of the Atchison, Topeka & Santa Fe have all been ordered to run only eight hours a day.

A press dispatch of June 9 reported a bad collision between a passenger train and some cars standing on the main track in the dark near Sabana Grande, Nicaragua. "Nearly a dozen" persons were killed.

The Lehigh Valley coal trestle and storage shed at Buffalo, about five miles east of the city, were destroyed by fire on the night of June 9, with 60,000 tons of anthracite coal and nearly 100 freight cars. This was a very large plant, and the loss is said to be about $500,000.

It is announced that the Philadelphia & Reading Receivers have decided to sell the large brown-stone office buildings on Fourth street, south of Walnut, in Philadelphia, now used as general offices, and will ask about $400,000 for them. The company will soon have all the office accommodations it needs at the new Twelfth and Market streets terminal station building.

The people of Texas still stick to their scheme of finding out and recording the cost and value of the railroads of the state and the value of their franchises, and the railroad commissioners have just issued a circular to the railroad companies on the subject. A new law has been passed to go into effect July 8, and the roads are requested to be ready to afford the commission facilities to make up the reports contemplated by the law. It appears that the new law authorizes the commission to employ experts to estimate the cost of the road, so if the right kind of expert can be produced in Texas we shall probably see some results that will astonish us.

The New York, Ontario & Western will run a new vestibuled train between New York city and the summer resorts on the line of the road, beginning June 24. The New York & New England announces through Pullman cars between Boston and Chicago, via Newburgh, N. Y., and the Erie road, three times a week each way. The time is about 36 hours. The Chicago, Burlington & Quincy has decided to put on a fast mail train from St. Louis to Chicago, leaving the former city at 3 a. m. It connects with the overland fast mail, running via Hannibal. It appears that the business men and newspapers of St. Louis guarantee a part of the expense.

A passenger train of the Chicago, Burlington & Quincy was stopped by robbers near Nodaway, Ia., on the morning of June 8, but nothing was stolen, the robbers stating that they intended to have stopped another train. On the night of June 9, six masked men stopped a train of the Mobile & Ohio at Forest Lawn, Ill., and robbed the express car, taking, it is said, about $10,000. The trainmen fired on the robbers, but did them no harm. On the night of June 9 express train No. 3 of the Atchison, Topeka & Santa Fé was stopped and robbed near Cimarron, Kan. The express messenger was wounded.

The Southern Pacific has lately begun running trains over the Pecos River bridge, which was built in 1891 to shorten the main line of the road, west of San Antonio, Tex., about 11 miles, but which has remained unused because of some difficulty about the terms of compensation. The bridge was built by an independent company and the plan was for the Southern Pacific to use it under an agreement to pay arbitrary rates on freight and passengers, as is done at large bridges over the Mississippi and at other places, but when the road was opened over the bridge the regulations of the State of Texas seem to have prevented the establishment of satisfactory rates of fare, and the bridge was used only two weeks.

The Cincinnati *Times-Star* says that important purchases of real estate in that city indicate that the railroads intend to build a new passenger station north of the present Grand Central station and on higher ground. The existing station is large and elegant, and only a few years old, but the tracks in it are submerged whenever the Ohio River reaches the 52-ft. stage, and the interruption of traffic by water is in some years very inconvenient. The Cincinnati, Hamilton & Dayton, which now terminates in a station of its own in the western part of the city, is said to be interested in the scheme for a new station. The Chesapeake & Ohio already has a track leading to the high ground referred to, and a few of its local trains start from a station there, though the principal trains run to and from the Grand Central station.

Lake Notes.

As an example of rapid handling of iron ore, the steamer Maryland arrived at Fairport Monday morning, unloaded 3,088 gross tons of ore and got away that evening. The following Saturday morning she was back again, after loading at Escanaba, and left that evening, having placed 6,177 gross tons on the dock as the result of the two trips.

The traffic of the St. Mary's Falls Canal for May (the canal was opened at 9:30 a. m. on May 1) was 1,311 vessels of all kinds. The total amount of registered tonnage was 1,180,763 and 1,174,900 tons of freight; 757 passengers were carried. This as compared with May, 1892, shows a decrease of 386,040 tons registered and 369,168 tons of freight. But the canal was opened 12 days earlier in 1892, and there was no ice blockade last year.

The steel steamer "Alva" has been launched by the Cleveland Shipping Co. It is 340 ft. over all, 42 ft. beam and 25 ft. deep, with a 54-in. water bottom, extending the length of the ship and divided into eight compartments. The engines, which are to drive a sectional propeller 13½ ft. in diameter with 16½ ft. pitch, have cylinders of 24, 38 and 61 in., with a common stroke of 42 in. Steam is furnished by two Scotch boilers, 24 × 13 ft., working to 120 lbs. pressure.

The new car ferry Sainte Marie, built by the Detroit Dry Dock Company for the Mackinac Transportation Company, is ready for delivery. Her dimensions are: 382 ft. over all, 50½ ft. beam and 24 ft. depth. Machinery: forward engine, which drives a 10½ ft. wheel, 28 and 52 in. cylinders with 40-in. stroke. After engine, which drives a 12-ft. wheel, 32 and 58 in. cylinders, with 48-in. stroke. There are four boilers, 11½ × 18 ft., carrying 120 lbs. of steam. This boat is to run between St. Ignac and Mackinaw City, 14 miles, and is expected to make the distance in one hour. The engines are expected to develop 4,000 H. P., which with the aid of the forward wheel in breaking the ice, and running it back, will enable the boat to make regular trips. Another peculiarity of the boat's outfit are the two steadying tanks: these, which are placed across the boat, are about 35 ft. long, and with a capacity of over 10,000 gallons: they are to be about half filled with water and it is thought that this water will offer a decided resistance to rolling in a sea way.

Big Bridge Talk Abroad.

It is proposed to build a high-level bridge across the Mersey at Liverpool, and to this end plans have been prepared by Mr. J. T. Wood, of Liverpool, and Mr. J. J. Webster, of Westminster. The distance between Liverpool and Birkenhead, namely, three-quarters of a mile, is, curiously enough, about the width of the East River between New York and Brooklyn, and which is spanned by the celebrated passageway that takes its name from the last-mentioned city. The Mersey Bridge would be on the arched suspension principle, and it would consist of three spans, each of 1,150 ft., the centre span being 150 ft. above the river at high water. There would be a roadway 40 ft wide for vehicles, and a footpath 7½ ft. wide on each side of the bridge, while an electric tramway would be laid above. Apart from this tramcar line, the cost of the structure is estimated at £1,730,000, and the annual income to be derived from it from goods traffic alone at £165,000.

Constantinople is another seaport where the construction of a gigantic bridge has long been projected, with the view of connecting European Turkey with Asia Minor by rail. The latest scheme proposes that the structure should span the Bosphorus a little to the east of the metropolis, approximately midway between the Golden Horn and the western extremity of the Black Sea. At this point the strait narrows considerably, but even there the passageway would require to be some 2,660 metres long, or nearly the length of the Forth Bridge. In this case the Adrianople Railway would branch off to the west of Constantinople, follow the Bosphorus in its easterly course, cross the strait, and continue on its way to Bagdad and the Euphrates Valley.—*Iron.*

Obstruction Signals.

There appears to be a sort of epidemic just now for inventing appliances for which we think the above is a suitable name. Briefly, these inventions, which are of course all carefully patented, consist of placing between or near the rails a movable "obstruction," which is worked by the signal wires from the cabin, and which (when the signal is at danger) engages with another more or less sensible obstruction attached to the engine. The collision between these obstructions (assuming always that the speed of the train is not great enough to smash up the apparatus altogether) actuates a system of rods or levers, and eventually rings a bell or otherwise "alarms" the driver, who then stops the train. And this is the kind of appliance that the inventors fondly imagine would, if adopted by the railroad company, render the dangerous and expensive "fogging" entirely unnecessary. There are dozens of patents varying, it is true, in pattern, but they may all be got inside the above description. In the hope that our advice may save a useless expenditure of money and time, we would say of these "obstruction" signals, that they are of no use for "fog signaling," because, though they might warn the driver to stop, they (with possibly one exception) cannot tell him when to go on, hence they leave off before the real duty of the fogman begins—the placing automatically of detonators on the rail has never been a very difficult problem. Another great objection to these obstruction signals is that *every* engine (foreign or otherwise) running on the line would have to be fitted. These are the two great objections, and when they are overcome we shall be glad to suggest others almost as important.—*Railway Engineer.*

Overflow of the Illinois Central Railroad in Louisiana.

During the exceedingly high stage of the Mississippi River early in the spring of 1892 a break of some 2,000 ft. occurred in the Belmont levee about 50 miles above New Orleans, causing the overflow of hundreds of square miles of the Louisiana swamps through which the I. C. R R. passes. Immediately after the break began a large force of men were engaged in an effort to repair the levee, but without success. All available forces were then employed in the protection of the roadbed and in the increase of existing waterways by raising the bridges. Sacks filled with clay or earth were placed at the ends of the bridges, along the slopes of embankments, and at the ends of ties, to afford protection from the scour. Brush was laid on the slopes and weighted down by old rails. To preserve the line where the track was submerged two methods of anchoring were used: 1, stakes about 3 ft. long were driven on each side and near each end of the ties; and, 2, a long iron rod shaped like the figure 7, so as to fit the top and sides of the tie, was driven at each end of a tie. The results obtained in the use of these methods were very satisfactory. About 50 miles of track was submerged the maximum depth of water being 31 ins. above the top of the rail at the lowest point in the track. Considerable damage to the rails resulted from the traffic which was maintained during the overflow. Freight trains were run continuously by substituting wood for coal; passenger trains were run over the submerged track for some time, but were discontinued before the water reached its maximum elevation. The approximate cost of raising the track was $66,000, and the renewal, repairs and raising of the bridges cost about $20,000 more.—*E. O. Strethlow,* in "*The Technograph.*"

Reduction of Train-Mileage in England.

We are informed that the managers of the leading railways are actively engaged in the preparation of their programmes of tourist and other arrangements for the coming autumn season of travel. There will, it is said, be no curtailment of the facilities to be afforded to the public, but some economies in train service of the leading companies may be arrived at by mutual understanding as to interchange of traffic between lines serving the same districts. Some reduction of duplicate trains may be made, and, under special conditions, tickets will be available on lines other than those on which they were issued. The passenger trains of the United Kingdom ran a total of 172 millions of miles last year, or close upon half a million per day, Sundays included. There are rather more than 20,000 miles of railway open, so that on every mile of the system railway passenger trains run an average of 25 miles per day. The goods mileage is somewhat less, but the combined services represent a daily average of train-mileage of about fifty times the length of the railways over which the service is conducted. On the metropolitan and suburban lines the proportion of train to rail mileage is, of course, vastly greater. On the combined systems of the Metropolitan and District railways, which, including the western extensions, make up a total of 70 miles, the train-mileage is in the proportion of over 150 to one mile

of rails. There is not much room for saving in the congested districts served by these lines.—*Railway News (London).*

Easy Enough When You Try.

The competition between the Intercolonial and the Canadian Pacific for freight traffic from Montreal to St. John has given St. John a much better service. The Canadian Pacific talked of a 72-hour service for cars of fruit. The Intercolonial took a car and ran it through in 48 hours. The Canadian Pacific took its innings and brought one down in 38 hours; then, to cap the climax, it attached a car to an express train, brought it to West Field, passed it over there to a freight train and laid it in St. John in 22 hours from Montreal.—*St. John (N. B.) paper.*

The New Cumberland Yard.

The Baltimore & Ohio officials have ordered the work on the new yards at South Cumberland discontinued, and Ryan & McDonald, the contractors, who have been prosecuting the work vigorously, have ceased all operations. The machinery has not been taken away and the discontinuance is looked upon as temporary.

The Jaffa-Jerusalem Railroad.

A correspondent of the *Moniteur Industriel*, writing of this road says that the train service is very irregular on account of the insufficient working force, and this is ascribed to the low wages paid to the railroad employés and the heavy fines imposed for the most trivial shortcomings. Some of the officials who were induced to come from France by more or less seductive promises have already resigned and gone away, and their places have been filled by young and wholly inexperienced natives, from whom, naturally, good service was not to be expected. The distance of 87 kilometres or about 54 miles, between Jaffa and Jerusalem is supposed to be covered by the regular trains in 3 hours and 45 minutes, but in four cases out of six, this time is said to be exceeded by two, three, and even four hours. While the greater length of the line is comparatively level, there are some heavy grades in the mountain sections on which the trains are frequently stalled and must await the arrival of a second locomotive before they can proceed. This applies to the passenger trains. The freight service is said to be still worse. Freight is frequently lost or stolen in transit, and shippers have found it impossible to secure indemnity for such losses.

Foreign Notes.

Galvanized sheet iron is becoming popular for roofing purposes in China, and the imports of the material at the port of Shanghai during the past two years amounted to 839 tons, valued at about $60,000.

The water ballast system of operating inclined cable railroads, the general features of which are familiar enough to make special mention of them here unnecessary, has been pronounced cumbersome and comparatively uneconomical by the Swiss engineer Strub. The coming system for such roads he considers to be the electric cable system like that already in use on the Bürgenstock and Salvatore mountain roads in Switzerland, referred to in earlier numbers of the *Railroad Gazette*. According to latest Swiss account, Mr. Strub has been retained to reconstruct the Beatenberg road to conform to this system. The primary power will be the water power there available, amounting to something like 150 H. P. Water wheels will drive the electric generators and these, in turn, will furnish the current for the motors to operate the cable machinery.

Rails for China—and Protection.

The Chinese order for some 12,000 tons of steel rails which has recently been on the market has, notwithstanding smart Belgian and German competition, been taken by Messrs. Bolckow, Vaughn & Co., of Middlesbrough, who quoted the low price of £3 12s. 6d. per ton, including fishplates, f. o. b. at that port.

It is, however, not abroad that we have to consider German competition for rail orders, as an event in Glasgow testifies. The Council invited tenders for steel rails and fishplates for tramways. The offers received were eventually reduced to three—one at £4 18s. 6d. per ton for the combined material, another at £5 1s., and the third at £5 2s. 6d. for the rails and £7 5s. for the fishplates. The lowest tender emanated, it appears, indirectly from Westphalia, the second offer was from the Darlington Iron & Steel Company, while the third came from the Steel Company of Scotland. A majority of the committee considering the matter decided to recommend the Council to accept the highest rate, and thereby secure employment for local workmen. And who will blame the committee? None, we should imagine—at any rate, so far as the foreigner is concerned; but the action is manifestly not altogether fair to the English firm which tendered lower than its Scotch colleague.—*Iron.*

The Great Northern Celebration at St. Paul.

The demonstration at St. Paul, Minn., last week, in celebration of the completion of the Great Northern Railway to the Pacific coast was a success in every way. The celebration was intended more particularly to show the appreciation, by the people of the Northwest, of great benefits to be derived from the completion of the second transcontinental line having its terminus at St. Paul. To James J. Hill, President of the Great Northern, who projected and carried to completion this magnificent system of railroad, the people desired especially to express their approbation. Had it not been for his energy it is probable that many years would have elapsed before the completion of the Great Northern's Pacific coast line. When he obtained control of the St. Paul & Pacific about a quarter of a century ago he had in mind reaching the coast. As the country developed the road was extended until it had built a network of lines in Minnesota and the Dakotas. Then the Montana extension was built, and following closely the Montana Central. Then came the crowning feat of the enterprise, the line through a sparsely settled country scaling the Rocky and the Cascade mountains, and reaching the Pacific at Puget Sound.

After the word to begin work on the Pacific extension was given there was no cessation. Although the Baring failure and the great financial depression made it impossible to raise money, the work was not delayed for a single day. Summer and winter it went ahead, and early in January last the last spike, joining the track from the East with that from the West, was driven on the western slope of the Cascade Mountains.

The ceremonies began on Wednesday with a monster street pageant. This was intended to exemplify, in addition to the industrial resources of the country, the progress in methods of transportation. First came the Indians with their movables, loaded on poles attached to ponies. Next the trapper with his pack and the French voyageurs. Then the Red River cart, the crude and wheezy river steamboat and the stage coach. From these nine primitive means of transportation to the consolidation engines, heavy freight cars, luxurious sleepers and the monster "whaleback" steamers the various stages of progress were represented. The city was beautifully decorated with flags and bunting—over 60,000 "Great Northern" flags being used.

Several beautiful white staff-covered arches had been erected, also a reviewing stand covered with the same material. On Thursday there was a popular reception tendered Mr. Hill, and he was, at that time, presented with a magnificent silver punch bowl. On Friday evening there was a complimentary banquet at the Aberdeen Hotel. It was presided over by ex-Governor Merriam, of Minnesota, and largely attended by prominent railroad and public men.

LOCOMOTIVE BUILDING.

The Manhattan Elevated (New York) this week gave out the order for its new locomotives, the order for the entire 20 engines going to the Pittsburgh Locomotive Works. Delivery is to be made in September and October.

CAR BUILDING.

The Gaston Coke & Coal Co. of Fairmont, W. Va., last week received 600 new coal cars, fitted with automatic brakes and couplers from the South Baltimore Car Works.

The first 50 coal cars being built at Amherst, N. S., for the Dominion Coal Co., Cape Breton, are well advanced, and will be sent out in two or three weeks. The foundry not being yet in operation, the wheels and other castings for this lot are obtained from St. John.

The Maine Central is receiving from the Laconia Car Co. its new passenger equipment for 1893. The orders include 22 cars altogether, 12 passenger, 3 smoking cars, 2 construction and 5 baggage cars. The passenger cars have an interior finish of California mahogany, with quartered oak ceilings and are upholstered with crimson plush.

BRIDGE BUILDING.

Catlettsburg, Ky.—W. F. Patterson, who has the contract for erecting the new bridge over the Big Sandy River at Catlettsburg, Ky., for the Chesapeake & Ohio Railroad, has commenced work, and has most of the preparatory work completed. Excavations for the masonry will be commenced within the next two weeks.

Christiana, Pa.—An iron structure will replace the old temporary wooden bridge over the excavations along the Pennsylvania railroad.

King City, Cal.—Sealed proposals will be received by the Board of Supervisors of Monterey County for a bridge across the San Lorenzo Creek near Kings City, Monterey County, until June 30.

Lancaster, Pa.—The counties of Lancaster and Chester will jointly erect a bridge over Octoraro Creek at Harkin's Ford, about a mile and a half south of Ashville.

Piedmont, W. Va.—The county commissioners of Mineral County, W. Va., have agreed to pay half the expense of erecting a highway bridge across the Potomac River between that city and Luke, Md. The estimated cost of the bridge is $12,000, and the county of Allegany, Md., will bear half the expense. The Allegany County Commissioners have not yet taken formal action, but a committee appointed for the purpose has made the necessary examinations, and has reported favorably upon the plan.

Vicksburg, Miss.—The Board of Supervisors has decided to build a second iron drawbridge over Big Lake. The site for the new bridge is Hall's or Fisher's ferry, about 25 miles from the city. Claiborne County, which will be connected with Warren County by the bridge, will be invited to join in its construction.

Welch, W. Va.—The County Court of McDowell County has let the contract for a highway bridge, 130 ft. long, to span Elkhorn River at Welch to F. M. Sperry.

West Chester, Pa.—The commissioners of Lancaster and Chester counties have decided to erect an intercounty bridge across the Octorara Creek at Harkness' Fording, near Oxford. The work of construction will be commenced in a few weeks.

RAILROAD LAW—NOTES OF DECISIONS.

Carrier of Goods and Injuries to Property.

The Supreme Court of South Carolina holds that it is the duty of a consignee, whose property is injured while in the control of a carrier, to pay all the freight charges, and then sue the carrier for the injury done.[1]

In the Federal Court it is held that an agent of a railroad, who merely collects freights, and has nothing to do with fixing them, is not indictable for a violation of the long and short haul clause of the interstate commerce act.[2]

In New York it is ruled that the issuance of a baggage check by a carrier to a passenger to a point beyond its own line is not a contract by the carrier to deliver the baggage at such point, but simply a means of identification of the baggage at the end of the route.[3]

In the Federal Court it is laid down that the "undue preferences" clause of the interstate commerce act is indefinite and uncertain, and a conviction for its violation cannot be sustained where the criminality of the act is made to depend on whether the jury think a preference reasonable or unreasonable.[4]

In Pennsylvania it is held that where it is practicable for an electric street railroad to cross the tracks of a steam railroad, by an overhead viaduct, at an expense not greatly exceeding $7,000, an injunction will issue to restrain the street railroad from constructing a grade crossing, which would be extremely perilous to human life, by reason of the descending grade and curvature of the tracks of the steam railroad, the obstructed view, the large number of trains (over 200 daily) passing over such tracks, and the difficulty of keeping electric cars at all times under perfect control.[5]

In New York, in an action against a railroad for destroying by fire grass on plaintiff's land lying along the railroad, it appeared that there were brush and dry grass on the railroad. Plaintiff was drawing rye from a field near the railroad, and while he was in the barn with a load a train passed. When he went in there was no fire, but on his return he saw the fire on the railroad burning the old grass, and the wind being high, it could not be extinguished, but destroyed plaintiff's field of grass. The course of the fire was traced back and found to have started next to the track of the railroad. The Supreme Court rules that the evidence was sufficient to justify the presumption that the fire was caused by sparks or coals from the locomotive which passed while plaintiff was in the barn.[6]

In the same case it is held that the defendant cannot escape liability on the ground that the accumulation of the dry grass and brush was due to the carelessness of the company which owned the road; since having adopted the road for its own use, and having set on fire through its own negligence combustible material along the track, defendant was answerable for the consequences.[7]

Injuries to Passengers, Employees and Strangers.

In Minnesota it is ruled by the Supreme Court that standing on the rear platform of a moving street car, even when there is room inside, is not, under ordinary circumstances, negligence *per se*, at least in the absence of any published rule of the carrier forbidding it.[8]

The Supreme Court of Texas holds that in an action for injuries sustained by being thrown against a car stove by a jar caused by coupling cars, the fact that plaintiff, then a child three years old, was at the time sitting with her mother by the stove for protection from cold does not constitute contributory negligence.[9]

In Minnesota it is laid down by the Supreme Court that a railroad is not bound to accept as a passenger on its cars, without an attendant, one who, because of physical or mental disability, is unable to take care of himself; but, if it voluntarily accept such a person without an attendant, his inability to care for himself, rendering special care and assistance necessary, being apparent or made known at the time to its servants, the company is negligent if such care and assistance are not afforded.[10]

In New York it is laid down that a brakeman, who was ignorant and uninformed of the dangers from trains passing on a curve, arising from unusual closeness of the tracks and the condition of the roadbed, is not guilty of contributory negligence, as matter of law, in being on a car step, while his train is on the curve, trying to enforce the orders of his superiors to keep passengers off the step.[11]

In Alabama, in an action for injuries to an employé, it appeared that one R. and his son were also employed in doing the same kind of work at another point on the same track, and that they were not directly employed by defendant, but were engaged by an employé of defendant who was doing work by the "piece." The Supreme Court rules that defendant was liable for any injuries to plaintiff caused by the negligence of R. and his son.[12]

In Indiana the evidence showed that decedent's duties as a brakeman required him to spend a part of his time on the top of the train, and that at the time of the injury decedent was carrying an order from the rear end of the train to the engineer, by direction of the conductor. The Supreme Court holds that the fact of decedent's walking on the top of the train, even though the train was running at a high rate of speed, does not constitute negligence on his part.[13]

In Missouri the evidence showed that plaintiff was one of a gang unloading ties from coal cars; that plaintiff and part of the gang were on the track behind the last car, when the roadmaster, who was on the car, and knew that it was not unloaded, ordered the men to come on board. Plaintiff was struck with a tie thrown from the car while going beside the car in order to mount it at the forward end. He could not easily go on the other side because the ground was sloped from the track. It was usual for the men to mount the car at the rear end, but there were several other men ahead of plaintiff, and only one could ascend at a time, and plaintiff supposed that it was necessary to hurry, as the train had to get out of the way of another train. Plaintiff did not know that there were still some ties on the car, and could not see them from where he stood. The Supreme Court rules that he was not guilty of contributory negligence.[14]

In Michigan the plaintiff, on beginning work as brakeman on defendant's road, was cautioned by the conductor not to do any coupling for a few days, but to watch the others and learn the method. A fellow-brakeman told him to be very careful about the deadwoods on the cars. On the second day of his employment plaintiff was with another brakeman while he coupled cars, but plaintiff testified he did not observe how it was done, because he was not instructed to. Later in the day, while switching cars, plaintiff was told by the other brakeman, as the cars slacked, to step in and pull the coupling pin, and in attempting to do so his arm was caught between the deadwoods and injured. The Supreme Court holds that plaintiff assumed the ordinary risks of the employment, and therefore, since he was exposed to no extra hazard, nor set at work which he had not sought and engaged to do, and since the injury was caused by a danger that was apparent, and which required no special training to foresee, he could not recover.[15]

The Supreme Court of Missouri lays it down that it is the duty of a person who comes on the track to use ordinary care to observe the movement of trains, and failure to "look and listen" may amount, in some circumstances, to a want of such care; but the standard by which action in that regard is to be measured is that degree of care which should characterize a person of ordinary prudence in the same situation.[16]

In Massachusetts it appeared that plaintiff came in on a train on the west track, and attempted to cross the east track towards the station and his home, as passengers were accustomed to do who lived on that side of the station, when he was run down by a train on the east track. The night was dark, but there was a headlight on the incoming engine. The gates at the end of plaintiff's car were not in use. There was a rule of the road that a train should not pass another which was discharging passengers at a station, but it did not appear that plaintiff knew of it. When plaintiff came down the steps of the car he looked around, and did not see anything. There was no evidence of any further looking, and it appeared that, had he looked again before stepping on the east track, he would have seen the approaching train in time to avoid the danger. The Supreme Court holds that the court properly directed a verdict for defendant.[17]

The Supreme Court of Missouri holds that it is not negligence *per se* for a railroad to have three freight trains reach a station at one time, at which station a passenger train with a right of way is about to pass,

provided proper precautions are taken for the safety of the employés.[18]

The Supreme Court of Alabama rules that where a railroad train is not stopped on approaching the crossing of another road, as required by the statute, and a collision ensues, resulting in the death of a brakeman on such other road, the company running the said train is, in the absence of contributory negligence, liable for the death.[19]

The Supreme Court of Pennsylvania holds that a traveler who, in order to let a freight train pass, stops his team at a point where his view of the crossing is obstructed by a building, is guilty of contributory negligence, as matter of law, in driving onto the crossing, though he looked before starting his horses, where the evidence is undisputed that if he had looked after passing the building, and before reaching the track, he could have seen the train with which he collided for the distance of over a third of a mile.[20]

In Missouri the Supreme Court holds that it is negligence in a railroad to run its trains in a city in violation of an ordinance regulating their speed, and requiring light on cars moving at night.[21]

In New York it is laid down that, where one is familiar with the dangerous surroundings of a railroad crossing, and, with the running of trains at that point, approaches it, with others, in a manner so boisterous and reckless as to prevent him from observing precautionary signals, and is injured by a train, he is guilty of contributory negligence.[22]

[1] Miami Powder Co. v. P. R. & W. C., 16 S. E. Rep., 339.
[2] United States v. Mellen (D. C.), 53 Fed. Rep., 229.
[3] Hyman v. C. Vt., 21 N. Y. S., 119.
[4] Tozer v. United States, 52 Fed. Rep., 917.
[5] Penn. Railroad v. Braddock Elec., 25 Atl. Rep., 780.
[6, 7] Genung v. N. Y. & N. E., 21 N. Y. S., 97.
[8] Matz v. St. Paul City Ry. Co., 53 N. W. Rep., 1071.
[9] Texas Cent. Ry. Co. v. Stewart, 20 S. W. Rep., 962.
[10] Croom v. C., M. & St. P. Ry. Co. 53 N. W. Rep., 1128.
[11] Mulvaney v. Brook, City R. Co., 21 N. Y. S., 427.
[12] Tennessee C., I. & R. Co. v. Hayes, 12 South. Rep., 98.
[13] E. & St. L. v. Utz, 32 N. E. Rep., 881.
[14] Foster v. M. Pac. Ry. Co., 20 S. W. Rep., 888.
[15] Dysinger v. C., S. & M. Ry. Co., 53 N. W. Rep., 825.
[16] Easley v Mo. Pac. Ry. Co., 20 S. W. Rep., 1073.
[17] Connolly v. N. Y. & N. E. Ry. Co., 32 N. E. Rep., 937.
[18] Smith v. M. P. Ry. Co., 20 S. W. Rep., 896.
[19] R. & D. Ry. Co. v. Freeman, 11 South Rep., 800.
[20] Urias vs. Penn. Railroad, 25 Atl. Rep., 566.
[21] Easley vs. Mo. Pac. Ry. Co., 20 S. W. Rep., 1073.
[22] Koehler vs. R. & L. O. Ry. Co., 21 N. Y. S., 844.

MEETINGS AND ANNOUNCEMENTS.

Dividends:

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Albany, quarterly, $2 per share, payable June 30.

Chicago & Eastern Illinois, quarterly, 1½ per cent., on the preferred stock, payable July 1.

Chicago Junction Railways & Union Stock Yards Co., semi-annual, 3 per cent. on the preferred stock and 4 per cent. on the common stock, payable July 5.

Cleveland, Cincinnati, Chicago & St. Louis, quarterly, 1¼ per cent. on the preferred stock, payable July 1.

Lehigh Valley, quarterly, 1¼ per cent., payable July 15.

Manhattan Elevated, quarterly, 1½ per cent., payable July 1.

Morris & Essex, semi-annual, 3½ per cent., payable July 1.

New York Central & Hudson River, quarterly, 1¼ per cent., payable July 15.

New York & Harlem, semi-annual, 4 per cent., payable July 1.

Northern Central, semi-annual, 4 per cent.

Pennsylvania & Northwestern, semi-annual, 3 per cent., payable July 10.

Rutland, semi-annual, 2 per cent. on the preferred stock, payable July 1.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Oregon Railway & Navigation Co., annual, Portland, Ore., June 19.

Peoria, Decatur & Evansville, special, Peoria, Ill., June 30.

Pontiac Pacific Junction, special, 162 St. James street, Montreal, Que., June 17.

Vermont Valley, annual, Brattleboro, Vt., June 21.

Technical Meetings

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *International Association of Car Accountants* will hold its next annual convention at Indianapolis, June 19.

The *Master Mechanics' Association* will hold its annual convention at the Kent House, Lakewood, N. Y., commencing June 19.

The *Train Dispatchers' Association of America* will hold its annual convention in Salt Lake City, Utah, June 20.

The *World's Railway Commerce Congress* in connection with the World's Fair at Chicago will hold meetings at Chicago during the week beginning June 19.

The *Association of Railway Telegraph Superintendents* will hold a meeting at Milwaukee, Wis., June 20.

The *New England Water-Works Association* will hold its twelfth annual convention at Worcester, Mass., June 14, 15 and 16.

The *Association of Railway Claim Agents* will hold its annual meeting in the Rookery Building, Chicago, July 11.

The *Western Railway Club* meets in room 730, The Rookery Building, Chicago, on the third Tuesday in each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 7.30 p. m.

The *Northwest Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month except during June, July and August, at 8 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Western Society of Engineers* meets at 78 La Salle street, Chicago, on the first Wednesday in each month, at 8 p. m.

The *Engineers' Club of St. Louis* meets in the Odd Fellows' Building, corner Ninth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Engineers' Society of Western Pennsylvania* meets at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month at 8 p. m.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday except during the months of June, July, August and September.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Tacoma Society of Civil Engineers and Architects* meets in its rooms, 201 Washington Building, Tacoma, Wash., on the third Friday in each month.

The *Association of Engineers of Virginia* holds informal meetings the third Wednesday of each month, from September to May inclusive, at 719 Terry Building, Roanoke, at 8 p. m.

Air Brake Inspectors' Association.

This Association was organized at Pittsburgh, Pa., June 8, the meeting being held in the Westinghouse Building. Delegates were present from 14 cities. The permanent organization was formed by electing Robert Burgess, of the Louisville & Nashville, President; C. C. Farmer, of the Missouri, Kansas & Texas, Vice-President; P. J. Carney, of the Milwaukee, Lake Shore & Western, Secretary, and Otto Best, of the Nashville, Chattanooga & St. Louis, Treasurer. Committees were appointed on constitution and by-laws, conference, maintenance, inspection, etc., and an executive body to act in conjunction with the President was also appointed. On Friday the delegates visited the Westinghouse Air Brake works and took dinner with the managers.

The delegates in attendance were: Robert Burgess, Louisville; C. C. Farmer, Parsons, Kan.; P. J. Carney, South Kaukauna, Wis.; Otto Best, Nashville; Paul Synnestvedt, Chicago; H. B. Shreve, Chicago; W. C. Walsh, Evansville, Ind.; F. M. Nelils, Texarkana, Tex.; L. B. Close, Pittsburgh; L. Martin, Philadelphia; J. D. Bragdon, Buffalo; Alex. Montgomery, Atlanta; J. L. Andrews, New Haven, and S. B. Hutchins, Columbus.

Engineers' Club of Cincinnati.

"Underdrainage as a Structural Feature in Engineering Construction" was the subject of a paper read by Col. Latham Anderson at a recent meeting of the Club, which treated of the underdrainage of earth work embankments as a means of promoting their strength and durability as engineering structures, the object of the drainage being to protect the embankment from sliding or washing from the action or presence of water; either by excluding it entirely or by leading away such as might or had accumulated.

Engineers' Club of Philadelphia.

A business meeting of the Club (the last before the summer recess) will be held on Saturday, June 17, 1893, at 8 o'clock p. m. Mr. C. H. Roney will read a paper on "Some Data in Reference to Modern Office Buildings." The subject for topical discussion is "Pressures That Can Be Safely Borne by High Masonry Walls," to be introduced by James Christie. By the invitation of Mr. S. T. Wellman, members of the Club will inspect the plant of the Wellman Iron & Steel Co., at Thurlow, Pa., on Saturday, June 17. Tickets should be obtained at Broad street station to Thurlow and return, and the party will leave by train at 1:32 p. m., although later trains at 2:28 and 3:10 can be used by those who find them more convenient.

At the meeting on June 3, President John Birkinbine in the chair, 32 members and visitors were present.

A topical discussion on improving the present status of the engineering profession was opened by the Secretary reading the paper on that subject by Mr. H. F. J. Porter, which was presented at the last November meeting of the American Society of Mechanical Engineers. He especially called attention to the desirability of making the professional degrees really indicate to the general public the capability of the engineer who used them, by having them conferred by a Board of Regents, embodied with power to confer titles for merit. It should be capable of judging what a man should know in order to bear a title, should endeavor to bring to unity all methods among the schools as to an engineering education, and should confer titles after a term of practice and after passing an examination, upon those entitled to them, thereby practically licensing the recipient to practice. It would not be absolutely necessary to attend a technical school to obtain a title, as a self-taught genius, proving himself capable, would be awarded one. A more natural division of the different branches of engineering was suggested, with a recommendation that the province and duties of the engineer in each division should be well defined, and that the practice of a man should be confined to those divisions in which he is competent and licensed to practice. It was thought that this matter might profitably be taken up at the Engineering Congress in Chicago, next August, and that the General Committee might act as the Board of Regents above mentioned.

Mr. Birkinbine stated that the tone of the general discussion which this subject had received in the technical journals tended to bar out from the use and benefits of a degree those who had not received one as the result of a college education, and that such a plan would work a great injustice to the self-made engineer, whom engineering societies and the world at large had in the past seen fit to honor.

Mr. G. Bacon Price called attention to one point of difference between the other learned professions and that of the engineer not generally considered; namely, that the community had not yet come to realize its need for the intelligent engineer, as it did for the doctor and the lawyer, for example, and that there was not at present a demand for their services to in anywise meet the numbers turned out by our technical schools. Whether a man has a degree or not, if his services are necessary and efficient his reputation will rise accordingly. Most of our young engineers, however, find it necessary to associate themselves with corporations or in partnerships in order to obtain a sufficient practice.

Engineers' Club of St. Louis.

The Club met on June 7 at the club rooms, President Moore in the chair, and 22 members and two visitors present. Mr. Frank B. Maltby was proposed for membership. In the absence of Prof. Howe, Mr. E. Flad read the paper of the evening on "The Hinged Suspension Bridge." The paper gave the full methods and diagrams for making all the calculations in suspension bridges. Discussion followed by Messrs. Gayler, Flad, Ockerson, Moore, Seddon and Russell.

Mr. Crow presented an interesting description of a dry kiln heated by steam which had caught fire at the top of the roof. Discussion followed by Messrs. Seddon, Ayer, Flad, Moore, Kinealy, Bryan, Judson and Perkins.

PERSONAL.

—Mr. J. L. Brown, Master Mechanic of the Pittsburgh & Western, has been appointed Superintendent of the Allegheny Water Works, and has resigned his position with the railroad company.

—Mr. C. W. Gibbs, who was Chief Engineer of the Silverton road and of the Rio Grande Southern during the construction of those lines, resigned the position last week because of the suspension of construction work.

—Mr. F. H. Alger, formerly General Agent of the Union Pacific at New Orleans, and recently General Freight and Passenger Agent of the Texas Central road, has been appointed Assistant General Manager of the American Brakebeam Company, headquarters at Chicago.

—Mr. John Sterling Deane, who has been appointed to succeed Mr. Adolphus Bonzano as Chief Engineer of the Phœnix Bridge Co., is a Member American Society of Civil Engineers, and has been connected with the company for the past 14 years, the past three years as Mr. Bonzano's immediate assistant and executive officer.

—George W. Howell and Edward Tibbetts, who were convicted of violating the Interstate Commerce law, have been pardoned by President Cleveland. Their crime was that of inducing a weighing clerk to under-bill freight shipped by their firm, and they were convicted at St. Joseph, Mo., in December, 1892. They had been sentenced to 18 months' imprisonment with a fine of $2,000 each.

—Mr. A. S. Douglas, formerly Superintendent of Motive Power and Rolling Stock of the Texas & Pacific, died in Battle Creek, Mich., on June 4. Mr. Douglas entered the service of the company as a machinist in its shops at Marshall, Tex., and soon became foreman at Big Springs, Tex., and then Superintendent of Motive Power. He recently resigned that position on account of ill health.

—Mr. J. A. Edson, who has been Superintendent of the Texas lines of the St. Louis Southwestern System for some time, has been appointed General Superintendent of the entire system. The office of General Manager, which was held by Mr. W. B. Dodridge, who resigned to become General Manager of the Missouri Pacific, has been abolished, and many of the duties of that office will hereafter devolve upon the General Superintendent.

—Mr. Patrick J. Flynn, M. Am. Soc. C. E., and well known as a civil engineer in California, died on June 1 last in Los Angeles. He had followed the engineering profession for about 35 years. He spent eight years in India, and for 14 years was connected with city engineering works in San Francisco and later in Los Angeles. He was the author of a book on irrigation, to which branch of engineering he had devoted special attention. He was a member of the Technical Society of the Pacific Coast.

—Capt. Andrew Faulkner resigned last week as General Passenger Agent of the Missouri, Kansas & Texas. He was appointed to that position in October, 1892. He had been for 10 years General Passenger Agent of the Houston & Texas Central, being connected with that company altogether 27 years. Mr. James Barker, who has been appointed Captain Faulkner's successor on the Missouri, Kansas & Texas, has been General Passenger Agent of the Louisville, New Albany & Chicago since 1889. He was previously Auditor and General Passenger Agent of the Wisconsin Central road for over 10 years.

—Col. R. A. Ricker, who has been General Superintendent of the St. Louis, Iron Mountain & Southern for the last five years, resigned last week, and Mr. E. A. Peck, until recently General Superintendent of the Cleveland, Cincinnati, Chicago & St. Louis, has been appointed as his successor. Colonel Ricker was General Superintendent and Chief Engineer of the Denver & Rio Grande between 1884 and 1888, and previous to this time he had been General Manager of the Gilbert & Bush Car Works, at Troy, N. Y.; General Manager of the New York Elevated Railroad in 1880, and Superintendent and Engineer of the Central of New Jersey for about 10 years up to 1876.

—Mr. Frederick Harrison has been appointed General Manager of the London & Northwestern Railway, to succeed the late Sir George Findlay. Mr. Harrison was born in 1844, and at the age of 15 entered the offices of the Monmouthshire Railway & Canal Co., and through the eventual absorption of this company by the London & Northwestern he entered the service of the latter corporation. As long ago as 1864, Mr. Harrison was directly under Sir George Findlay, who was then General Goods Manager. In 1872 he was sent to Liverpool as Assistant Passenger Superintendent. Later he became Assistant to the General Manager, and in 1885 was made Chief Goods Manager. It will be seen that he has had that thorough training, up through the various subordinate grades, which seems to be necessary to make a really competent railroad manager. He is said to be a man o great physical and mental vigor, and he has reached a very high position, that of General Manager of the greatest of the English railroad companies, at an early age.

ELECTIONS AND APPOINTMENTS.

Chicago, Rock Island & Pacific.—Stockholders of the railroad held their annual meeting at Chicago, June 7. The directors, whose term of office had expired, were all re-elected. Subsequently the directors held a meeting and elected officers for the ensuing year as follows: President, R. R. Cable, of Chicago; Vice-President, Benjamin Brewster, of New York; W. G. Purdy, of Chicago, and H. A. Parker, of Chicago.

Denver & Rio Grande.—A. T. Wells has been promoted to the position of General Freight Agent of the road. For three years past Mr. Wells has acted as assistant general freight agent. He has been connected with the company since 1876, when he entered the railroad service as clerk in the auditing department.

Duluth & Iron Range.—The annual meeting was held at Duluth, Minn., June 12. The company elected as officers: H. H. Porter, of Chicago, Chairman; J. L. Greatsinger, President; Joseph Sellwood, of Duluth, and C. W. Hilliard, of Chicago, Vice-Presidents; C. W. Hilliard, Secretary and Treasurer.

Florida Midland.—A. E. Drought, Receiver, announced that J. M. Booth, Auditor, will also have charge of the General Freight and Passenger Departments of this road, vice George E. Simpson, resigned.

Kishacoquillas Valley.—The company held its annual election on June 10 and elected directors as follows: H. M. Walters, President, Belleville, Pa.; directors: John M. Flemming, J. P. Getter, Wm. B. Maclay, J. Y. Zook, H. S. Wilson and A. C. Henderson, all of Belleville, and Solomon Peachey, of Menno, Pa. The board organized as follows: H. S. Wilson, Vice-President; Wm. B. Maclay, Secretary; W. M. Gibboney, Treasurer. John B. Gemmill is General Superintendent, and F. F. Whittekin, of Tionesta, Pa, the Chief Engineer who built the road, will remain with the company as Consulting Engineer.

Lake Street Elevated (Chicago).—Frank Hedley, for several years Master Mechanic of the Kings County Elevated Railroad, of Brooklyn, has been appointed Superintendent of Machinery of this road. Mr. Hedley was formerly General Foreman of the Manhattan Elevated road.

Lebanon Springs.—The directors named in the charter filed last week are William V. Reynolds, of Reynolds, N.Y.; Edwin D. Foster and A. B. Harrison, of Englewood, N. J.; Schuyler A. Rockfellow, of Howe's Cave; W. Foster, Jr., C. F. Stone, Charles L. Trotter, Alfred W. Trotter and Edward W. Brown, of New York City; Redfield Proctor, of Proctor, Vt.; M. S. Colburn, of Manchester, Vt.; C. W. Reynolds, of Petersburg, N. Y., and E. W. Paige, of Schenectady.

Mexican Central.—At a meeting of the directors at Boston on June 5, the organization was completed. The names of some of the officers then elected were published last week. The following officers have also been elected: J. T. Harmer, Comptroller, Boston, in charge of the Accounting Department; will report to the President F. S. Anallo, General Auditor, Boston; C. A. Browne,; Assistant Treasurer, City of Mexico, and W. A. Frost, Auditor, City of Mexico. In addition to his duties as Comptroller, Mr. J. T. Harmer, has been appointed Assistant to President, and will represent the President in Boston in the latter's absence.

Minneapolis, St. Paul & Sault Ste. Marie.—The annual meeting was held at Minneapolis last week. The old Board of Directors, consisting of Thomas Lowry, W. D. Washburn, John Martin, R. B. Laugdon, C. H. Pettit, J. S. Pillsbury and W. C. Van Horne, was re-elected.

New York, Texas & Mexican.—James Mooney, Master Mechanic of the New York, Texas & Mexican and of the Gulf, Western Texas & Pacific, with headquarters at Victoria, Tex., has resigned, and his successor is Mr. Ganieck, at present foreman in the Cuero shops. Mr. Mooney has been Master Mechanic on this road since 1872.

Niagara Junction.—At the recent annual meeting the stockholders elected as directors Edward D. Adams, Francis L. Stetson, D. O. Mills, Charles F. Clarke, Chas. Lanier, F. W. Whitridge, Edward A. Wickes, Joseph Laroque, George S. Bowdoin and William B. Rankine, of New York, and Charles A. Sweet, of Buffalo. This road is controlled by the Cataract Construction Co.

Oconee & Western.—M. Mahoney has been appointed General Freight Agent of the road, in Georgia.

Racket River.—The incorporators are W. Wyckham Smith, William Wills, Foster L. Backus, A. L. Chatterton and George R. Crossley, of Brooklyn; Russell L. Kinsay, of Buffalo; Frank E. Bennett, of Topeka, Kan.; J. L. Ludwig and A. R. Dodge, of New York City.

Rome, Watertown & Ogdensburg.—H. C. Humphries, Assistant Engineer and Surveyor of the company, has resigned, and W. J. Wilgus has been appointed to the vacancy.

St. Louis, Alton & Terre Haute.—The annual meeting was held at St. Louis, June 5. The five directors whose terms expired were re-elected as follows: G. Foster Peabody, W. B. Cutting, R. F. Cutting, Spencer Trask and W. A. Reed, all of New York. The board was reorganized as follows: G. Foster Peabody, Chairman: G. W. Parker, President and General Manager, St. Louis; W. S. Wilson, Superintendent, Pinckneyville, Ill.; G. W. Parker, Treasurer; Edward F. Leonard, Secretary, St. Louis.

St. Louis Southwestern.—W. B. Doddridge having resigned as General Manager to accept service elsewhere, the office has been abolished. J. A. Edson has been appointed General Superintendent, with headquarters at Texarkana, Tex. All reports heretofore made to the General Manager will be made to the General Superintendent.

San Antonio & Aransas Pass.—W. G. Neimyer has been appointed General Western Freight and Passenger Agent of this company, with headquarters at 230 Clark street, Chicago.

State Line Connecting.—The stockholders of the company met in Wellsburg, W. Va., last week and elected as directors A. E. Succop, A. E. Nieman, L. A. Meyron, R. L. McCully, and R. H. Cotton. The Board elected L. A. Meyron President; R. H. Cotton, Secretary, and A. E. Neiman, Treasurer.

Winona & Southwestern.—At the annual meeting of the stockholders the following officers were elected: H W. Lamberton, President; V. Simpson, Vice-President; Thomas Simpson, Secretary; M. G. Norton, Treasurer; Directors for the ensuing three years: H.W. Lamberton, V. Simpson, Jos. Walker, Jr., and E. S. Youmans.

Wrightsville & Tennille.—F. H. Robertson has been appointed General Freight and Passenger Agent of the road, with headquarters at Tennille, Ga.

RAILROAD CONSTRUCTION,
Incorporations, Surveys, Etc.

Altoona & Phillipsburg Connecting.—E. A. Tennis, of Thompsontown, Pa., has the contract for building this road between Phillipsburg and Janesville, Pa. The distance between these points is 20 miles, and connection will be made at Phillipsburg with the Beech Creek road and at Janesville with the Altoona, Clearfield & Northern. The road is to be completed by Oct. 1, next.

Baltimore & Cumberland.—This company has under serious consideration a change of the route which was originally selected. The route which has been permanently surveyed and decided upon started from a point opposite Cumberland and went by way of North Branch, where it crossed the Potomac River and Chesapeake & Ohio canal into Maryland, thence by way of Oldtown and Town Creek, then following Sugar Run and by way of the gap of Green Ridge to Orleans and Hancock. This route would parallel the Baltimore & Ohio and Chesapeake & Ohio canal for 40 miles. The new route proposed is by the way of Flintstone, Md. Flintstone is a good town for traffic, and 10 miles can be saved in the distance by taking that route. A party of engineers started out last week to make a survey of the proposed new route. This line will take the road across the Potomac River at a point near the mouth of Evitts Creek and will follow the valley to the gap of Green Ridge. Flintstone is also willing to subscribe $150,000 to the stock of the company in case the change is made. The county commissioners of Mineral County, W. Va., have secured all the right of way desired by the road in that county. The work of construction is progressing on the western end of the line.

Bayfield Harbor & Great Western.—The contract for clearing the right of way from Bayfield, Wis., was let last week, and the contractor has begun work near that town. President Dalrymple has made arrangements for building the first division of the road from Bayfield, Wis., and it is announced that the actual work of construction will begin in a few days, and will probably be continued until this first division is completed. The road was located in 1891, from Bayfield Harbor, on Lake Superior, for about 20 miles, and the preliminary survey continued to a connection with the Northern Pacific, about 40 miles.

Bush Grove & Bayou.—The company has been chartered in Louisiana to build a road to extend from a point near Rousseau station to a point near Thibodaux, La. Joseph W. Libbey, of New Orleans, is President.

Canadian Pacific.—The Minister of Railways states that he believes the company will build through the Crows Nest Pass into the Kootenai country, British Columbia, early next year. Some grading had already been done and a party of surveyors were now in the pass laying out the route. The work of clearing would perhaps go on this year, and early next year actual construction would commence. It was also very likely that the line from Revelstoke, B. C., to Arrow Lake would be built and also the Nakusp & Slocan line, also in British Columbia.

Central of Pennsylvania.—Nearly 400 men are now at work on the grading, most of them in the vicinity of Hecla, Pa., where the roadbed is constructed for some distance. The contractors are also working near Bellefonte, Pa., and Mill Hall, Pa.

Chicago, Rock Island & Pacific.—The contractors on the work south of Bowie, Tex., are now laying about two miles of track daily, the construction material which has delayed the work so materially having now been delivered along the line in large quantities. The bridge across the Trinity River near Aurora, Tex., was completed last week, and the track has been completed to that point, and will this week reach Tarrant County, of which Fort Worth is the county seat. Train service on the line south of Bowie has been extended to Chico and Park Springs.

Chicago, St. Paul, Minneapolis & Omaha.—The grading on the Newcastle extension has been pushed so fast that it is now assured of completion by June 20. The bridging has hardly been commenced, because of the delay in the arrival of the materials. The old line between Sioux City and Ponca, Neb., is being improved extensively. The heavy grade between Jackson and Ponca has been cut down 15 ft.

Coos Bay, Roseburg & Eastern.—The road is now in operation from Marshfield to Coquille City, Or., 18 miles, and the grading is now going on south of Coquille City up the Coquille River to Myrtle Point, about eight miles. The contractor, R. A. Graham, has been seriously delayed by the weather, but is now pushing the work as rapidly as possible. The line is to be in operation to Myrtle Point in August.

Crystal River.—The Crystal River line was badly washed out by the spring rains and floods in Colorado caused by melting snows, and will not be completed until July.

Dallas & Fort Worth Rapid Transit.—This company, which was recently organized to build a direct railroad connection between Dallas and Forth Worth, Tex., has authorized an issue of five per cent. bonds to the amount of $1,000,000. Spencer M. Janney, of Philadelphia, is President of the new company.

Denver & Rio Grande.—The extension of 12 miles from Crested Butte, Col., is being pushed by the contractors. A corps of engineers is running a survey from Silver Cliff to a point near Cotopaxi for the local company that proposes building a line to connect with the Denver & Rio Grande.

Elk Mountain.—The company negotiating loans has another expert looking over the field to decide upon the resources of the tributary territory. It is believed that this line will be built eventually, and local railroad men assert that it is a most promising investment. Some grading has been done near Carbondale, Col.

Florence & Cripple Creek.—Bids have been received for grading the line and will be opened before the end of the month. It is believed that the road will be built at once from Florence to the Cripple Creek mines.

Florida Central & Peninsular.—About 10 miles of the track has been laid on the Savannah extension up to the present time, the contractors working from the southern end of the line. This brings the end of track beyond the Georgia State line to near the St. Mary's River. The bridge over this river, and two other bridges on this division, are now being erected. The extension will be 115 miles long to Savannah, Ga. All the work is being done by the Southern Supply Co.

Golden Gate.—A company has been recently incorporated in Oregon under this name, with W. S. Campbell, of Rochester, N. Y.; John Manning, of Portland, Ore., and G. W. Cricket, of Eugene, Or., as directors. The road outlined in the charter is to begin at San Pablo Bay, in Sonoma County, Cal., and extend northwesterly through various counties in Oregon, with a number of branches.

Great Northern.—Work on the Leech Lake extension of the Park Rapids branch, in Minnesota, is well under way and tracklaying will be begun about June 25. This extension is about 24 miles in length and is from Park Rapids to Leech Lake, Minn.

Intercolonial.—Fifteen hundred tons of 67-lb. steel rails have arrived for replacing the track of this railroad between St. John and Moncton, N. B. When these rails are placed in position the whole of the road, with the exception of two or three short sections, will be laid with 67-lb. rails.

Kishacoquillas Valley.—The track is now completed from Reedsville to Belleville, Pa., nine miles, and the road has been opened for traffic between those towns. Reedsville is the junction point with the Pennsylvania road.

Moncton & Buctouche.—The syndicate of American capitalists who have secured a charter by which they may acquire this railroad have been looking over the ground with a view to extending the line to Richibucto, N. B., and the establishment of a steam ferry between Richibucto, in New Brunswick, and West Cape, in Prince Edward Island. They state that, having procured a charter some time ago, they are now ready to carry out their plans, as soon as the necessary arrangements can be made with the Government. These plans include the purchase of the Buctouche & Moncton road, which is to be sold in August next, under an order of the Equity Court, the construction of an iron bridge over the Buctouche River, the placing of a steam ferry between Richibucto and West Cape, the construction of harbor works at West Cape, and the building of a branch line of railroad from West Cape to the main line of the Prince Edward Island Railroad.

New Cumberland & Pittsburgh.—This company was incorporated at Harrisburg, Pa., this week, with a capital stock of $400,000. The proposed road will be 16 miles long, and will extend down the south bank of the Ohio River from the point on the dividing line between the States of West Virginia and Pennsylvania, where the New Cumberland branch of the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad touches the state line.

New Roads.—Grading has been commenced upon the railroad that is to connect the Atlantic copper mine with the proposed new mill site on Lake Superior near the mouth of Salmon Trout River. The road will be about nine miles long and will be located principally upon the mining company's land.

Ohio Southern.—Work on the Lima extension of the road is being pushed with vigor, the grade between Springfield and De Graff, O., being completed, with the exception of that through the city of Springfield, upon which men are working night and day. Between St. Paris and Lima there are hundreds of men at work.

Portsmouth Park.—The Portsmouth Park Railroad & Development Co., which proposes to build a belt road about four miles long at Portsmouth, Va., connecting with the Norfolk & Western, has recently secured from the City Council an important franchise for extending its tracks along some of the principal streets of the city. It is proposed to begin work under this franchise immediately. The connection with the Norfolk & Western is made at Gilmerton, and the building of the new line will give that company an important new entrance into Portsmouth.

Racket River.—This company was incorporated in New York last week. The incorporators, W. W. Smith, of Brooklyn, J. L. Ludwig, of New York City, and others, propose to construct a standard gauge road about 20 miles in length, to be operated by steam or electric power, from Potsdam to and through the village of Pierpont to the village of Colton, with a branch at or near Hannawa Falls to Parrishville, in St. Lawrence County.

St. Paul & Duluth.—The contract for changing the grade of the main line, at Barnum, Minn., has been let to Messrs. Million & Young. The work extends over a distance of two miles and, in that distance, the line will be shortened ¼ of a mile; the curvature reduced 50 degrees and the grade reduced from 40 to 13 ft. a mile. There are about 25,000 yards of earth to be moved, and the work is to be completed on Aug. 1. The company is also completing the work, begun last year, at Moose Lake.

San Diego & Yuma.—The actual grading of the first section of the road to Yuma, Ariz., has commenced. Arrangements have been made for the immediate construction of ten miles of the road beyond the southern limits of of the Coronado belt line at San Diego, with whose owners a traffic agreement has been made. Ties and rails for this ten miles of the road have been secured and this with the belt line will give 32 miles of track toward the line to Yuma.

Saranac & Lake Placid.—The contractors on this new Adirondack road have about 700 men employed on the construction work. The grading is now practically finished and the tracklaying is in progress. The road is being built from Saranac to Lake Placid, connecting with the Adirondack & St. Lawrence line, the distance being about 10 miles. Brady Bros., of Bayonne, N. J., have the contract. C. E. Arnold, of Albany, is President.

Seattle & Northwestern.—It is announced that two engineering parties will be put in the field next week by the company with a view of locating a line from Seattle, Wash., through Cherry Valley to a junction with the Great Northern at some point west of the Cascade mountains. Judge Thomas Burke and John Leary, of Seattle, are the principal incorporators.

Southern Pacific.—The right of way has been secured for a branch of this road from Burbank, Cal., on the line north of Los Angeles west to Chatsworth Park, Los Angeles County, about 18 miles. The grading was commenced early this month and will probably be completed in July, although the contract does not require the completion of the road until Oct. 1. An effort will be made to have the road in operation in August in time to move the heavy grain crop of the San Fernando Valley through which the road is to be built.

Texas, Louisiana & Eastern.—This road is now completed for about 30 miles east of Conroe, Tex., the

end of track being about five miles from Cleveland station, where connection is made with the Houston, East & West Texas road. The road has been graded for eight miles additional, and the track will probably be laid this summer.

Union Pacific.—A two and one-half mile extension of Catskill branch is being built to a new lumber camp in New Mexico.

Wheeling & Lake Erie.—This company is getting things into shape to continue its line from Martin's Ferry to Bridgeport and possibly to Bellaire, O. Condemnation proceedings were last week begun for a piece of ground on the bank of the Ohio River between Bridgeport and Martin's Ferry, now held by the Cleveland, Lorain & Wheeling road, but not at present occupied with a railroad track. When the case was called, the company announced that an amicable arrangement had been reached. The acquisition of this piece of land gives the Wheeling & Lake Erie access to the large iron works located between Bridgeport and Martin's Ferry, and insures that the extension will be built. The condemnation proceedings instituted against property in Martin's Ferry are still before the court. It is also reported on what seems good authority that the company is also preparing to extend its line from Steubenville, O., to East Liverpool, O., a distance of 30 miles.

Winchester & Beattyville.—It is announced that this road is now entirely completed and ready for regular operation. It is only six miles long from a point on the Kentucky Midland near Winchester to the Kentucky River at Beattyville, and the track was laid last year.

GENERAL RAILROAD NEWS.

Chicago, Rock Island & Pacific.—The company reports its earnings for the year ending March 31, as follows:

	1893.	1892.	Inc. or dec.	
Gross earnings	$20,971,110	$18,690,075	I.	$2,281,035
Oper. expenses and taxes	15,083,688	13,147,056	I.	1,936,632
Net earnings	$5,887,422	$5,543,019	I.	$144,403
Other income	10,000	122,200	D.	62,200
Total income	$5,947,421	$5,665,219	I.	$282,202
All charges	3,899,367	3,731,982	I.	167,385
Balance	$2,048,054	$1,933,237	I.	$114,817
Dividends	1,846,232	1,384,674	I.	461,558
Surplus	$201,822	$548,563	D.	$343,736

Fairmont, Morgantown & Pittsburgh.—A meeting of the stockholders of this company was held at Fairmont, W. Va., last week, at which considerable business was transacted. The capital stock was increased to $3,000,000, and an issue of bonds to that amount was authorized. Another meeting of the stockholders will be held Aug. 8, at which time the matter of consolidating the road with the State Line road, a Pennsylvania corporation under which the extension in that state has been built, under a new name, will be considered. The road will be completed through to Uniontown, Pa., about Sept. 1. A large section of the Morgan tunnel on the line fell in last week, and it will require at least two weeks to remove the obstruction. Along Grassy Run and Cheat River, the washouts of the embankments and fills are very bad, and it will require many weeks to put the roadbed into shape for tracklaying. From Smithfield to Morgan tunnel the roadbed is almost ready for the rails.

Illinois Central.—The earnings from traffic for the 10 months ending April 30, 1893 and 1882, are reported as follows:

	1893.	1892.	Inc. or dec.	
Miles operated	2,888	2,888		
Gross earn	$16,403,278	$16,227,582	I.	$175,696
Oper. expen. and taxes	11,944,409	11,660,828	I.	283,581
Net earn	$4,458,869	$4,556,754	D.	$107,885

The gross receipts from traffic for the month of May, 1893, are estimated at $1,716,745; the receipts for May, 1892, were $1,458,354, an estimated increase of $258,391.

Kansas City, Wyandotte & Northwestern.—This road was sold at sheriff's sale at Kansas City, June 12, under foreclosure of a mortgage for $1,000,000, held by the Farmers' Loan & Trust Co., of Boston. The Missouri Pacific came into practical possession of the road about two years ago. The road was bought in by the Missouri Pacific. It has a mileage of 283 miles, and runs from Kansas City to Beatrice, Neb.

Lancaster & Quarryville.—Bondholders of the company, representing more than half of the issue amounting to $350,000, at a meeting last week, voted not to accept the terms offered them under the re-organization plan. Under the present lease the bonds, which mature July 1, 1893, have been drawing seven per cent. interest, and it is proposed by the Reading plan to extend them 25 years at four per cent.

Lebanon Springs.—A new charter for this road was issued at Albany last week, and W. V. Reynolds, Receiver, has turned the property over to the new company, which represents the purchasers at the foreclosure sale in May, 1892. The road is 57 miles long from Bennington, Vt., to Chatham, N. Y., and has been involved in almost continuous litigation for the last half-dozen years.

Long Beach.—The Pennsylvania resumed train service on June 11 over the branch of this leased road to Barnegat City, N. J., a distance of six miles.

Manitoba & Northwestern.—H. M. Allan, of Montreal, one of the directors of the company, was appointed Receiver at Winnipeg, Man., last week. The company having failed to pay the interest on its first mortgage bonds, a suit by the appointment of the Receiver was brought by Messrs. Allan, of Montreal, who hold large judgments against the company and are representatives of the chief stock and bondholders.

Northern Pacific.—It is announced that the entire $12,000,000 subscriptions to the collateral trust notes of the company have been made up by the underwriting syndicate. The subscriptions were made in large blocks, one being for $3,500,000, one for $2,500,000, one for $1,000,000, six for $500,000 each, and the balance in smaller amounts.

The collateral trust loan is to run for five years and bear interest at the rate of 6 per cent. It is secured by the deposit of the collateral now held to secure the floating debt, the St. Paul & Northern Pacific stock owned by the company, the Northern Pacific Express stock and other securities in the treasury of the Northern Pacific.

Oregon Pacific.—At Corvallis, Ore., this week, Judge Fullerton made an order further postponing the sale of the road from June 28 to Oct. 28. Judge Fullerton stated that the strongest factor inducing him to postpone the sale was his desire to have the road sell for a good figure so that all creditors might be protected.

Philadelphia & Reading.—President Harris has issued an address to the security holders of the company in which he explains why their interests will best be conserved by the proposed plan of reorganization. The obligations of the company due and unpaid on March 13 amounted to $18,472,828. Securities which might have been available in the present emergency are locked up in loans made before the receivership, and are liable to be sold by the pledgees. These securities are largely stocks of the companies whose properties compose the Reading system. President Harris says that if reasonable prosperity in the country at large shall continue, the earnings of this company should ordinarily be sufficient to pay its obligatory charges; and that if a careful, conservative policy, which shall develop the present estate and positively refuse to make new ventures, shall be pursued, the company's position should gradually grow stronger. He refers to the Lehigh Coal & Navigation Company and to the Central Railroad Company of New Jersey as evidences of what can be accomplished by careful management of companies which have been extricated from like distressing pecuniary conditions. Of the Voting Trust, Mr. Harris says: "The persons who, under the plan, compose the Voting Trust were named by the syndicate, which proposes to make the very large advances of money required, amounting in all to about $25,000,000, they insisting as a condition precedent to their action that conservative management shall be secured for a time sufficiently long to develop all the possibilities of the situation. It is doubtless disagreeable to the stockholders to part with the control of their property for so long a time, but they must decide whether this is not the safest course now open to them. My deliberate opinion, then, is that the assistance asked for in the proposed plan for the rehabilitation of the Reading company is none too great, and that there is a good probability that, if it is afforded and the plan is carried out, prudent and careful management may prevent the recurrence of such a crisis. My judgment is that the security holders will make a very serious mistake if they do not accept the relief offered them, for I see no probability that the necessary assistance can hereafter be obtained except upon much more onerous terms. I most strongly advise that the plan shall be promptly accepted, and that the assents necessary to make it operative shall be given." President Harris says that by economies in the company's management a saving of over $200,000 a year has been accomplished, and the reduction of the Lehigh Valley rental to 5 per cent. will effect a further annual saving of $800,000. The deposits of stock under the reorganization plan up to June 14 were 135,000 shares, out of a total of 796,000. Of the general mortgage four per cent. bonds, $14,000,000, out of $44,353,000, have been deposited.

Richmond & West Point Terminal.—Drexel, Morgan & Co. announced this week that over 95 per cent. of all classes of securities of the Richmond & West Point Terminal Railway & Warehouse Co. had been deposited under the terms of the reorganization plan. The firm now controls, through securities deposited, the main lines of the Richmond & Danville and Georgia Pacific railroads. The time for receiving further deposits of Richmond & Danville five per cent. bonds and the bonds and stocks of the Georgia Pacific will expire on June 27. The complete reorganization of the system under the published plan will now be pushed with all the expedition possible.

St. Louis, Chicago & St. Paul.—In the Sangamon Circuit Court, the Atlantic Trust Company of New York filed a petition this week for the foreclosure of a mortgage against the Railroad for $1,250,000. The Court appointed Charles E. Kimball with Joseph Dickson Receivers of the road.

TRAFFIC.

Traffic Notes.

The Atchison, Topeka & Santa Fe and the Houston & Texas Central have made a round trip passenger rate from Houston to Chicago of $44.80, about $6.50 less than the previously existing rate.

Texas papers state that the wheat crop in the Texas Panhandle is very large. The Atchison, Topeka & Santa Fe is now taking large quantities to Galveston. One account states that the crop will amount to 7,000,000 bushels.

The Texas-Mexican Railroad, which extends from the northern terminus of the Mexican National, at Laredo, Tex., eastward to Corpus Christi, announces that it will put on a line of steamers between Corpus Christi and New Orleans.

The "free-pass bill," which was recently before the Michigan legislature and which required railroad companies to carry certain state officers, judges and members of the legislature free, was finally killed, the Senate rejecting it.

The Denver & Rio Grande Express Company will continue to operate over the Rio Grande Western for some time yet, the Western Express Company, which has taken the contract to operate on this road, not being ready to begin business.

Texas, like several other states, has passed a law intended to prevent speculation in tickets. It includes a strict regulation for the redemption of unused tickets and goes into effect Aug. 10. The roads of that state have recently met to agree upon a form of ticket to be used.

On June 8 the Kanawha Despatch, the Savannah Steamship Line and the Central Vermont announced some very low commodity rates on dry goods and other things, from New York to Mississippi River points, but it was reported on Tuesday that the Trunk Line Association had succeeded in getting these rates withdrawn.

The Interstate Commerce Commission has begun a suit in the United States Court at Norfolk, Va., against the New York, Philadelphia & Norfolk Railroad, the issue being unreasonable freight rates on fruit and vegetables. In April, 1891, the Commission decided on complaint of the Delaware Patrons of Husbandry against this and other roads that certain rates ought to be reduced 20 per cent. In March, 1892, the roads applied for a rehearing but were denied. The present suit is evidently brought to compel compliance with the Commission's order.

Chicago Traffic Matters.

CHICAGO, June 14, 1893.

Several meetings of the representatives of Western lines were held last week to consider the various difficulties with the revised agreement of the Western Passenger Association. As a result of these meetings it was agreed to make no low excursion rates until Aug. 1, and to maintain the present agreed basis on World's Fair traffic; also to include in the association the Colorado and Utah traffic, about which there has been so much dispute. After these matters had been adjusted, the Committee again took up the agreement and proceeded to bring it into conformity to the various propositions which had been adopted since it was suspended. The Committee reported to the general meeting yesterday, and the agreement is practically sure of unanimous adoption to-morrow, to go into effect at once, the last road to sign being the Minneapolis & St. Louis. The success which has attended the work of the Committee on Revision is gratifying as showing a disposition on the part of all lines to work in harmony. The membership of the Association under the revised agreement includes the lines which have recently withdrawn from the Association, as well as the Chicago & Alton, which has not been a member for a long time. The agreement is much more comprehensive than the old one, the Committee having endeavored to meet all the objections raised to the old agreement and to make additions to meet the important wishes of all the lines in interest. In view of the lateness of the present decision it has been agreed that no penalties for violation of the agreement will be exacted until after June 20. The trans-Missouri committee of the association will hold a meeting in Denver on June 19 for the purpose of perfecting various local rules.

The Baltimore & Ohio, Baltimore & Ohio Southwestern, Chicago & Grand Trunk, Big Four, Erie, Grand Trunk, Grand Rapids & Indiana, Lake Shore, Nickel Plate, Pan Handle, Fort Wayne, Toledo, Peoria & Western and Vandalia lines have agreed to run excursions to the World's Fair at half rates. The agreement says:

That special train excursions, which shall consist of coaches only, be run and alternated to Chicago and return by the various lines in interest from common points in the territory of the Central Traffic Association at a rate per capita not less than one fare based on the highest rate for limited tickets by the route traveled. Tickets of a special form shall be used on all such trains, which shall also be plainly printed good for continuous passage to Chicago only on such special trains, and for continuous return passage on such special trains or in coaches attached to any regular train, for a period not exceeding a limit of four days, including date of sale. Such tickets shall not be good in parlor or sleeping cars in either direction. To take effect not earlier from starting points than June 14.

The Chicago and Ohio River lines will inaugurate the half-fare excursions to the World's Fair on June 16. On that date the Big Four will run an excursion from Cincinnati, and the Monon one from Louisville. On the succeeding week the Pennsylvania will run from Louisville and the Monon from Cincinnati, in connection with the Cincinnati, Hamilton & Dayton. Similar alternations are arranged for at Indianapolis.

A special meeting of the Western Freight Association convened yesterday to take up a large number of matters of local interest which had accumulated since the last meeting and which it seemed desirable to dispose of before the next regular meeting.

The Southern Pacific has again refused to pro-rate with its Eastern connections on traffic via Ogden to meet the competition of the Atchison, Topeka & Santa Fé. Eastern connections will probably be forced to accept the terms of the Southern Pacific, or else discontinue all through billing westbound.

The Interstate Commerce Commission has two of its representatives here endeavoring to secure evidence before the Federal Grand Jury in some of the cases on the docket of the Commission. They are extremely reticent as to what they are after, and it is surmised that their efforts are in the direction of a general "drag net" investigation, with the hope of finding something worth asking indictments on.

It is reported that the railroads have decided to strictly enforce the new maximum rate bill in Nebraska. This, if true, indicates that the law will soon prove so oppressive that its repeal will be asked for. The only fear is that some line will decline to do so, hoping that by so doing it can curry a little favor with its patrons.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines, for the week ending June 10 amounted to 61,647 tons, against 52,559 tons during the preceding week, an increase of 9,088 tons, and against 59,736 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	W'k to June 10		W'k to June 3.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	6,982	11.3	6,768	12.9
Wabash	3,573	5.8	1,547	2.9
Lake Shore & Michigan South.	12,039	19.5	10,356	19.7
Pitts., Ft. Wayne & Chicago.	9,054	14.7	8,448	16.1
Pitts., Cin., Chicago & St. Louis	7,114	11.6	5,150	9.8
Baltimore & Ohio	2,792	4.5	3,130	6.0
Chicago & Grand Trunk	3,976	6.5	3,935	7.5
New York, Chic. & St. Louis	5,773	9.4	5,705	10.9
Chicago & Erie	7,959	12.8	5,934	11.3
C., C., C. & St. Louis	2,114	3.9	1,586	2.9
Totals	61,647	100.0	52,559	100.0

Of the above shipments 1,564 tons were flour, 27,170 tons grain and millstuff, 8,205 tons cured meats, 11,995 tons dressed beef, 1,918 tons butter, 1,964 tons hides and 6,354 tons lumber. The three Vanderbilt lines carried 40.2 per cent., the two Pennsylvania lines 26.3 per cent. The Lake lines carried 104,359 tons, against 86,770 tons during the preceding week, an increase of 17,589 tons.

Other Chicago traffic news will be found on page 438.

Coal Traffic for Five Months.

The following reports are published of the coal tonnage for the calendar year to June 3, compared with their respective amounts carried to the same time last year:

	1893.	1892.	Inc.
Philadelphia & Reading	10,938,397	10,306,910	631,487
Clearfield	1,330,393	1,196,267	134,126
Huntingdon & Broad Top	877,043	768,062	108,981
Beech Creek	1,382,833	1,198,956	183,896
Chesapeake & Ohio	3,176,132	2,476,608	699,524

The report of the Pennsylvania Railroad shows a total tonnage for the year, of coal and coke, of 8,779,718 tons, compared with 8,220,287 tons in the corresponding period of 1892, an increase of 559,431 tons, of which 6,414,717 tons were coal, an increase of 597,224 tons, and 2,365,001 tons coke, a decrease of 37,793 tons.

The total amount of anthracite coal sent to market for the year to June 3 was 17,280,090 tons, compared with 16,114,358 tons in the corresponding period of 1892, an increase of 1,165,732 tons.